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December 1946

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ELECTRONIC INDUSTRIES

Beginning next month (January, 1947) and reflecting current growth and specialization in the electronic arts, the editorial contents of Electronic Industries will be enlarged and divided into two specialized and separate magazines, with names and fields as follows:—

TELE·TECH

Continuing the TELE-communications TECHnical Section of Electronic Industries

Radio, AM, FM
Television, Facsimile
Transmitters, Receivers
Police, Aviation
Railroad, Radar
Design, Operation

ELECTRONIC INDUSTRIES & INSTRUMENTATION

Continuing the Industrial-Application Features of Electronic Industries

Measuring, Recording
Control, Regulation
Detection, Protection
Processing, Treating
Energy Supplies
Design, Production

Each of the new specialized magazines will serve its own important groups of readers with completeness impossible in the former paper.

Enlarged editorial staffs and increased reading pages will permit new standards of editorial value and service for the individual reader.

For further detailed information, including subscription arrangements and general publishing plans, see pages 18 and 19 of this issue.

O. H. Caldwell, M. Clements
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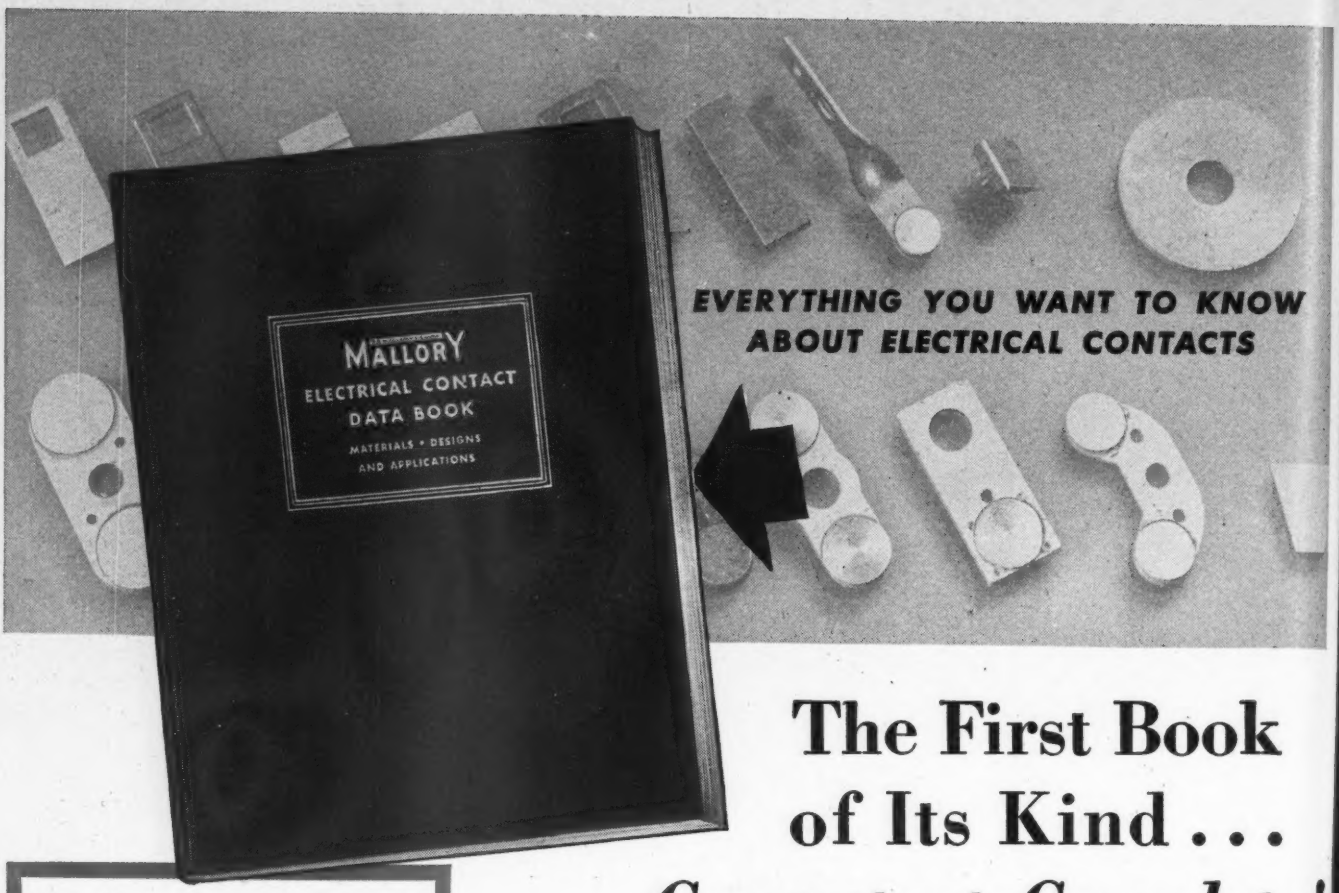

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ELECTRONIC INDUSTRIES

Including INDUSTRIAL ELECTRONICS

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CALDWELL-CLEMENTS, INC.—TEL. PLAZA 3-1340—480 LEXINGTON AVE., NEW YORK 17, N. Y.

BRANCH OFFICES—Chicago 6, R. Y. Fitzpatrick, 201 N. Wells St., RAN 9225; Cleveland 14, D. J. O'Rourke, Citizens Bldg., 850 Euclid Ave., Main 8270; Los Angeles 5, The Robert W. Walker Co., 684 So. Lafayette Park Pl., Drexel 4388; San Francisco, 68 Post St., Sutter 5568.

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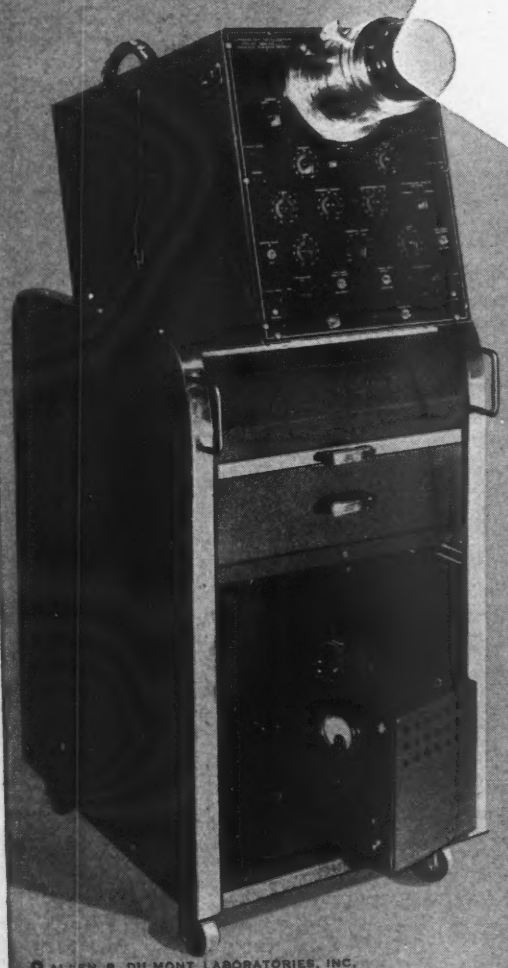

Modified from the Type 247, this new Du Mont Type 247-A is such a startling success that phenomena hitherto totally invisible can now be *easily* seen. Such modification extends the range of the instrument tremendously in the field of transient studies or high-speed photographic applications.

The modification utilizes the new Type 5RP Cathode-Ray Tube operable at voltages up to 30 KV, producing sufficient brilliance for direct projection, if required.

Other features are: automatic beam blanking; choice of single or continuous sweep; sweep rates available from .5 cps to 50,000 cps; Z-axis amplifier with choice of output polarity; soundly engineered electrical and mechanical design.

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ELECTRONIC INDUSTRIES

Including INDUSTRIAL ELECTRONICS

O. H. CALDWELL, EDITOR ★ M. CLEMENTS, PUBLISHER ★ 480 LEXINGTON AVE., NEW YORK (17), N. Y.

Absurd Power Restrictions

Several times we have called attention to the absurd restrictions on the power of broadcasting stations, from which the industry and public continues to suffer.

Carrying this point into some actual figures, let us estimate the powers now commonly required to serve say a million people—250,000 homes:

Electricity	2,500,000 kw
Automobile engines ...	12,500,000 kw
Radio broadcasting ...	50 kw

Amazing as this comparison is, the fact remains that multiplying broadcasting powers even ten-fold or 100-fold would instantly put an end to interference from practically all natural and man-made static. Home receivers would be simplified and cheapened. And tremendously improved reception would be supplied the public.

DeForest Invented Tube Just 40 Years Ago

This month marks the 40th anniversary of the invention of the three-element "audion" by Dr. Lee DeForest. For actually, it was during December, 1906, that the first triode was produced and tested in the attic lab in the old Parker Building, 4th Ave. and 19th Street, New York City. But the famous patent application was not filed until Jan. 29, 1907.

Frank E. Butler, then as now, closely associated with Dr. deForest, explains the five-week delay as resulting from "Doc's" characteristic generosity of heart. After the tube was invented, Butler had gone out West to get married, and "Doc" had previously promised the young couple he would "show them New York".

Unannounced, the Butlers landed in town just as DeForest and his attorney had completed drawing up the patent specifications, although the inventor had only enough cash on hand for the Patent Office fee. But, that the honeymooners be not disappointed, deForest quickly gathered up the precious patent-fee money and started out with the Butlers on a round of theatres, restaurants and the old Hippodrome. Available cash was soon used up, and no more was forthcoming for weeks.

And that is the hitherto unpublished story of why the filing of the "audion" patent application was delayed five weeks because of the inventor's big heart and small bank account.

Speedy Electronic Computation

Industrial companies are now making extensive use of electronic computing machines. An unusual example was the enlistment of the M.I.T. differential analyzer to compute the proper curvature of some refractory-brick furnace arches. The object was to have all resultant forces tangent to the arch faces, so that no mortar would be needed!

The M.I.T. machine is particularly suited for helping industry because its various connections and shaft settings can be made in a few minutes by insertion of a new punched tape in the control apparatus.

Cosmic Static on TV

Some years ago, the radio short-wave radiation coming from the center of our Milky Way Galaxy, was broadcast over a national network by your editor, in collaboration with Karl Jansky, of Bell Labs., discoverer of this celestial static.

Now it turns out that these same cosmic emanations from the Milky Way actually can increase the "noise" received by a television receiver. On 60 mc a good television receiver, that is, one that has a noise factor of not more than 4 db when measured in the laboratory and under conditions where cosmic radiations can cause no disturbance, will have an increased noise output of 9 db to 12 db when connected to a normal antenna. This noise output varies with the earth's sidereal rotation (about 23 hours and 56 minutes), the diurnal peak coinciding with the passing of the Milky Way overhead.

For Detailed Information on Our New ***See Pages 18 and 19***

EXPANDED SERVICE FOR ELECTRONIC READERS

As announced on our front cover, the editorial service of *Electronic Industries* beginning next month, January, will be expanded into two specialized monthly magazines: 1. "TELE-TECH", continuing the TELE-communications TECHnical section of the parent publication, and 2. "Electronic Industries & Instrumentation", covering industrial applications and factory electronics.

On pages 18 and 19 of this issue, we present full details of the new plan. There you will also want to read about the subscription arrangements which the publishers are making to supply each reader with an expanded editorial service best suited to his own special needs.

Z-METER

Basic laboratory instrument which opens up a new and important field in electrical and electroacoustic measurements

By L. E. PACKARD
Technology Instrument Corp.,
1058 Main St., Waltham, Mass.

Fig. 1 — The type 310-A Z-Angle meter is self-contained in a small portable cabinet, including ac operated power supply, visual balancing and phase meter, impedance standards, and source for two common test frequencies

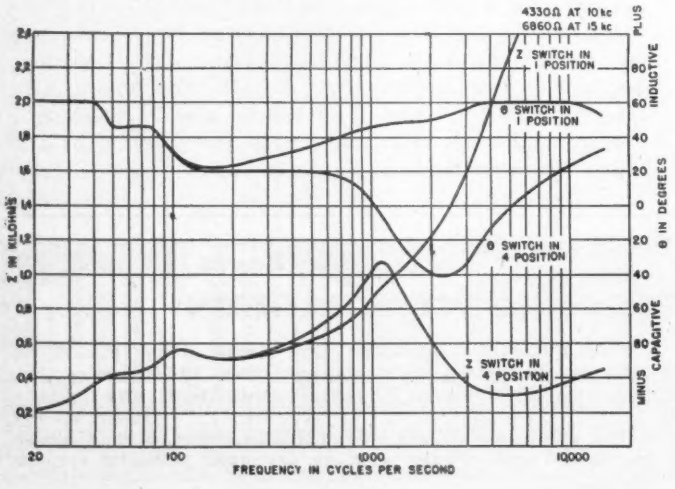
• Audio frequency measurements on communications circuits and units such as microphones, lines, transformers and speakers require the determination of complex impedances, usually at low phase angles, for which ordinary general-purpose bridges are not particularly adaptable. The simpler two-voltmeter method of measuring impedance gives no indication of phase angle and is subject to serious errors resulting from the residual reactances involved in a hastily made set-up. Equipment has therefore been developed, giving for the first time the convenience and simplicity of the common two-voltmeter measurements, with the accuracy at both low and high phase angles of elaborate and costly bridges. Furthermore, the instrument is direct reading in the units most generally useful to the communications engineer, namely, ohms impedance and degrees phase angle, and unlike most ac bridge circuits, the readings are completely independent of frequency.

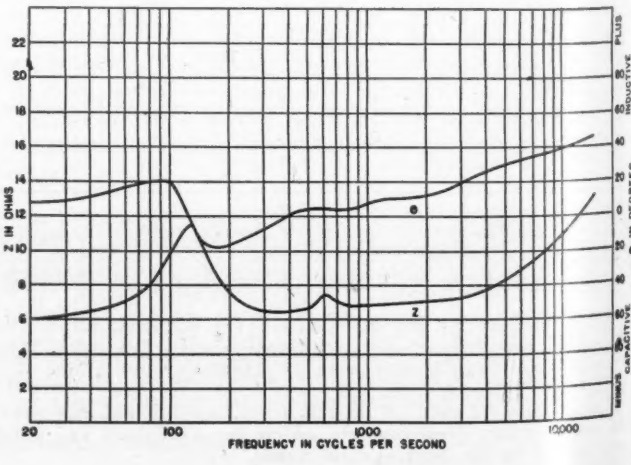
A specially shielded and balanced input transformer renders negligible the usual effects of stray capacitance and coupling to a degree impossible when separate units are assembled for impedance measurements.

As a typical illustration of the type of data which can be easily and quickly obtained, Fig. 2 shows the impedance and phase angle characteristics of a typical coaxial loudspeaker incorporating a cross-over filter network. Curve A represents the characteristic of the low frequency unit alone. It is generally typical of direct radiator loudspeakers, but with more inductance in the voice coil than is common for speakers which must handle the high frequencies as well as the low.

When the tweeter and associated cross-over network are connected into the circuit, the over-all impedance characteristic is as shown by curve B. Both curves show the wide variation possible in the impedance of a loudspeaker system. Such a system is normally intended to provide design-objective frequency response when operated from a particular impedance. Here it is important that the speaker be operated from the proper impedance, for a correct overall frequency characteristic. Otherwise wide variations in impedance will cause equivalent wide variations in the frequency re-

Fig. 2—Impedance and phase angle characteristics of a typical coaxial loudspeaker with and without cross-over network, with and without cross-over filter network and tweeter. (Curve A marked "Z, switch in 1 position". Curve B marked "Z, switch in 4 position".) Fig. 3—Impedance and phase angle function of single-unit direct-radiator loudspeaker





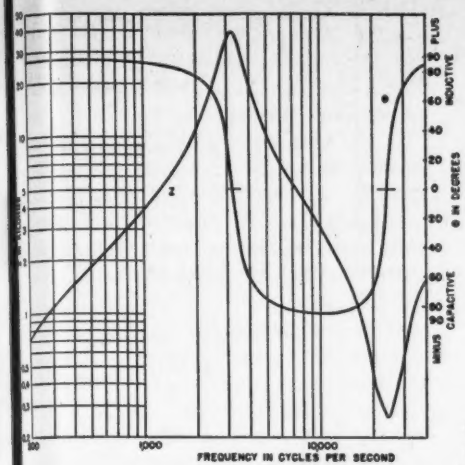


Fig. 4—Impedance and phase angle function of audio-frequency bridge isolating transformer with primary and secondary open circuited

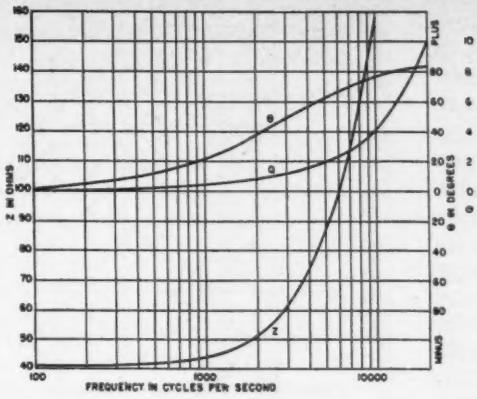


Fig. 5—Curves showing variation of impedance, phase angle and storage coefficient Q of rf choke

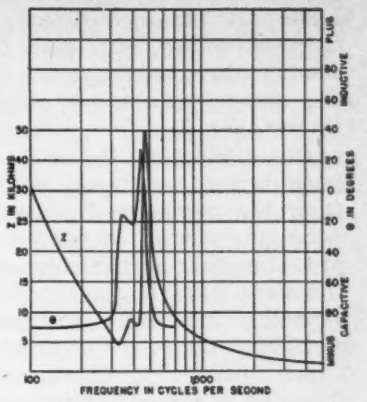


Fig. 6—Impedance and phase angle function of 6000-ohm band pass filter, terminated in 6000 ohms

sponse characteristic. For example (curve B), if the speaker were operated from an extremely high impedance, such as an output circuit containing pentodes or beam power tubes without inverse feedback, the response would be greatly exaggerated in the region of 1000 cycles.

The phase angle characteristics of the loudspeaker indicate how much of the available electrical power is actually converted into other forms of energy. Obviously a high reactive impedance will limit both the amount of power which can be drawn from the source, and the percentage which can be converted to useful energy. A low phase angle over the important frequency ranges tends to indicate a higher degree of efficiency than a high phase angle.

As to the problem of non-linear distortion, many power amplifiers particularly those with high impedance output tubes and no feedback, are extremely critical with respect to load impedance. A brief examination of tube handbook curves for load impedance distortion will quickly indicate this effect, which is still further exaggerated by impedances having high phase angles.

Only by knowing fully the impedance and phase angle characteristics of the loudspeaker is it possible to know whether or not many types of amplifiers will provide sufficiently distortion-free performance. The poor quality of many so-called high fidelity systems can often be attributed to the fact that test measurements were made with a dummy resistance load, with the loudspeaker added later.

Distortion measurements on a power amplifier operating into a fixed resistance load generally are quite useless in determining actual performance with a loudspeaker. The same applies to practically any amplifier operating into a network which does not represent a pure resistive impedance or which may have wide variations in impedance and phase angle with frequency because of electrical or mechanical resonances.

In another example, Fig. 3, the impedance and phase angle characteristic of a wide-range single-unit direct-radiator loudspeaker do not exhibit as great variations in impedance as those shown in Fig 2. However, the high and low frequency impedances still vary sufficiently from the average to necessitate careful matching to an amplifier for best results. The curves shown in Figs. 2 and 3 both represent relatively high priced, high grade speakers. With lower grade units, the effect of mismatching may often be even more serious.

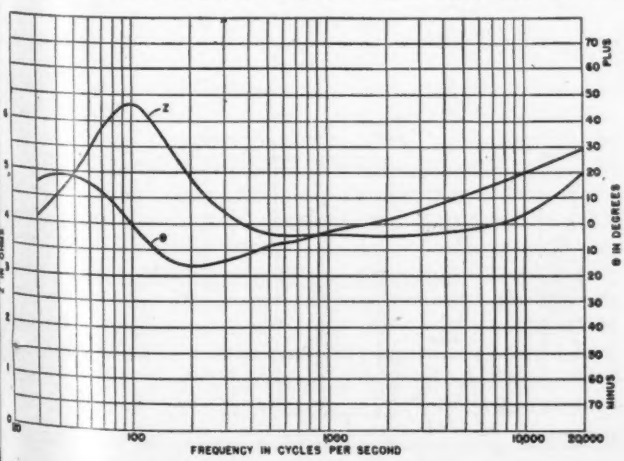
Other interesting examples of the various applications of the Z-Angle meter are the impedance and phase angle functions of a bridge isolating transformer, Fig. 4, an rf choke, Fig. 5, a band-pass filter, Fig. 6, and a microphone, Fig. 7. These examples exhibit wide variations of Z and θ with frequency, variations which are important both from a design and application point of view.

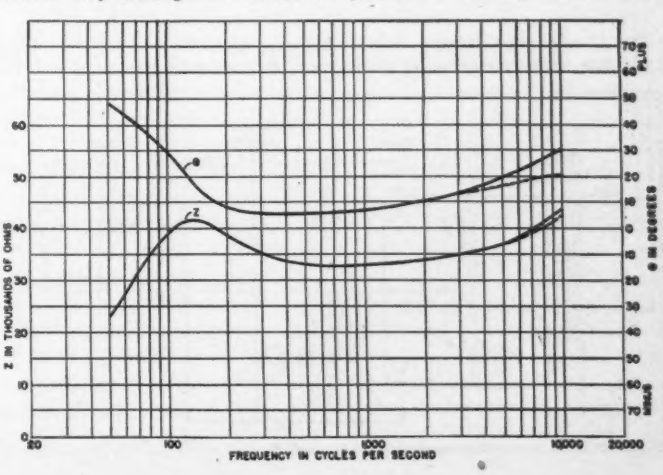
R, L and C measurements

The range of the Z-Angle meter in impedance is essentially from 0.5 to 100,000 ohms and phase angle from +90° through 0 to —90° (L through R to C) over a frequency range of 30 to 20,000 cps (Fig. 8).

The range of the instrument is as follows: R—0.5 to 100,000 ohms, L—5 microhenries to 500 henries, C—0.0012 to 10,000 microfarads.

Fig. 7a—Impedance and phase angle function of microphone. Fig. 7b—Impedance and phase angle function of microphone with matching transformer





Readings of impedance and phase angle are obtained directly from the instrument, but these can be readily converted to values in henries and microfarads by simple relations, Fig. 9.

The dissipation factor D of capacitors and the storage coefficient Q of inductors are frequently desired, and since D is related to the phase angle θ as the cotangent of the angle θ and Q, the tangent of θ, supplementary scales are provided on the meter so as to provide direct readings of D and Q, with the following ranges: D—direct reading from 0.1 to 10, and Q—direct reading from 10 to 0.1.

These extremely wide ranges of R, L, C, D and Q makes the Z-Angle meter far more versatile than widely used single-frequency universal bridges.

Basic circuit

The circuit used in the Z-Angle meter is derived from the common two-voltmeter or voltmeter-ammeter method of measuring impedance. Here in a series circuit, the voltage drop across a known resistance is compared with the voltage drop across an unknown impedance when the same current is passed through both, as in Fig. 10. A direct measure of impedance is obtained in terms of the standard resistance by adjusting the variable resistance standard until the two voltage drops are the same. This is equivalent also to the voltmeter-ammeter method, since the voltage drop across the standard resistance is proportional to this current.

It has become customary in many laboratories to set up this circuit when needed, using standard laboratory oscillators, decade resistance boxes and vacuum tube voltmeters. When absolute accuracy is not too important, this procedure is acceptable. However, as is always the case when miscellaneous laboratory parts are assembled in this way, errors due to residuals

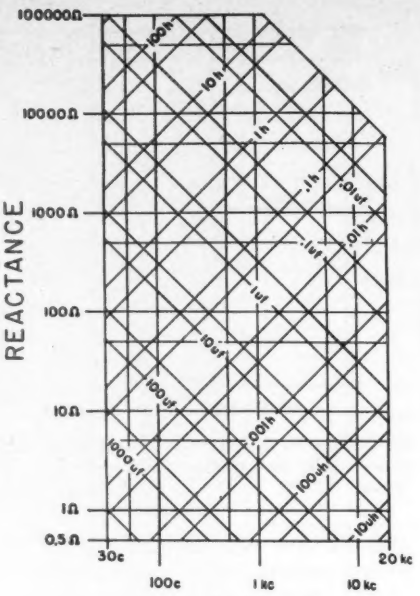


Fig. 8—Showing the magnitudes of impedance and frequency ranges covered by instrument

within the basic circuit elements, stray capacitance, extraneous pick-up and coupling between the leads are not analyzed, hence, there is good reason for questioning the accuracy of the final answer. A detailed analysis of error in even the simplest of circuits is something that requires a great deal of time and thought, and in most laboratories time does not allow for proper consideration of such problems.

Phase angle

Furthermore, the basic two-voltmeter method gives no information regarding the phase angle of the unknown impedance, a serious shortcoming, because in the majority of the examples cited above, the impedance is not sufficiently defined without a knowledge of its phase angle.

Various circuits are used to obtain this information, but because of the complications involved and the difficulty of obtaining quantitative information in the desired

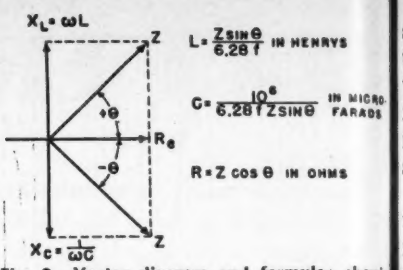


Fig. 9—Vector diagram and formulae showing relation of R, L and C to Z and θ

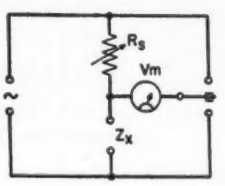


Fig. 10—Two-voltmeter method of measuring impedance

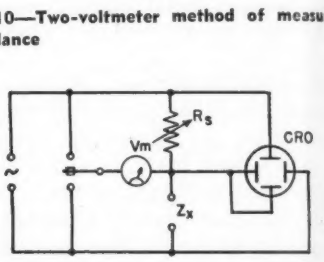
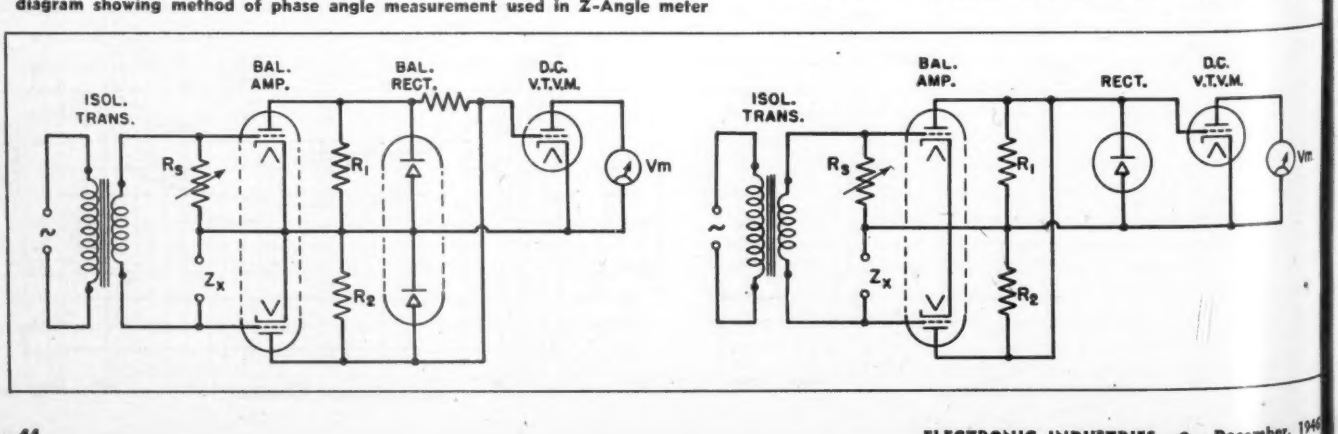


Fig. 11—Method of observing the phase angle of an unknown impedance through use of cathode-ray oscilloscope

units but generally they are not resorted to. Perhaps the most common method is the use of a cathode ray oscilloscope in the simplified circuit shown in Fig. 11. Such an arrangement will show departure from zero degrees phase angle by the change of a linear pattern into an elliptical or circular pattern on the screen of the oscilloscope. However, this method leaves much to be desired when quantitative measurements are involved.

In place of the voltmeter and switching circuit, a balanced amplifier and vacuum tube voltmeter combination is used in the Z-Angle meter for comparing the two voltage drops, providing considerable improvement as to the ease, accuracy and rapidity with which a balance may be obtained. It provides

Fig. 12—Simplied diagram showing balanced amplifier and rectifier assembly used in Z-Angle meter for impedance measurement. Fig. 13—Simplified diagram showing method of phase angle measurement used in Z-Angle meter



a null balancing method rather than comparing two voltages by alternately impressing them on an indicating meter. The circuit used for impedance measurements is shown schematically in Fig. 12.

The isolating transformer serves to isolate the measuring circuit from the oscillator, and the balanced amplifier, rectifier and vacuum tube voltmeter combined indicate the impedance balance by comparing the algebraic sum of the rectified voltages from the balanced amplifier. The vacuum tube voltmeter is designed to indicate a balance at midscale, and meter deflections on either side of the balance point indicate the direction of the unbalance. This not only increases the ease of operation but provides for production test applications a direct indication of whether the unknown is "High" or "Low".

The magnitude of the deflection indicates the amount of unbalance, and if desired a special percentage deviation scale may be used, the range of which may be used without the necessity of special adjustments over the entire frequency and impedance range of the instrument. The percentage deviation range of the meter is approximately from —30 to +20% with essentially uniform subdivisions. With production applications in mind, it is interesting to compare the production testing features of this circuit with the performance of conventional ac bridges and null detectors, the latter varying widely in sensitivity with bridge setting and providing no direct indication of direction of deviation.

The impedance balance is accomplished by the adjustment of a single dial, which not only simplifies the balancing procedure but makes impossible a condition of "sliding balance" which is frequently encountered when measuring a low Q inductor or capacitor with an ac bridge.

Direct indication

The phase angle, storage coefficient Q or dissipation factor D is read directly on the meter by simply altering the circuit with the switches provided, so that the rectifier and vacuum tube voltmeter respond to the vector sum of the voltages appearing across the output of the balanced amplifier. The vector sum of these voltages is a measure of the relative phase difference between the voltage across the standard and the voltage across the unknown when the same current is passed through both. The circuit as arranged for phase angle measurements is as shown in Fig. 13.

A measure of the vector sum of the voltages appearing across the outputs of the balanced amplifier is accomplished by connecting the plate load resistors (R_1 and R_2) in parallel and impressing the resulting voltage across the rectifier and vacuum tube voltmeter combination. The magnitude of the voltages across R_s and Z_x are equal because such is the requirement for the impedance balance which is always made prior to the phase angle measurement. Fig. 14 shows the operation of the circuit on a vector diagram. When Z_x is a pure resistance and when the voltages appearing across the grids and plates to ac ground are 180° out of phase with each other and the resultant voltage is zero, hence no deflection is obtained on the phase angle meter. With either a pure inductive or capacitive reactance as Z_x, the phase difference betwen the voltages appearing on the plates and grids are 90° out of phase and a resulting voltage which produces full scale meter deflection is obtained.

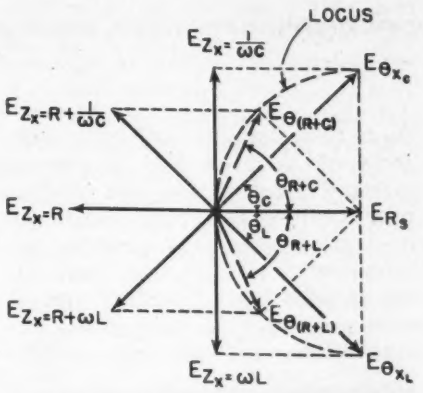


Fig. 14—Locus of vector sum of voltages producing phase angle readings as Z varies from pure R to pure + or — reactance, the latter two producing 90° or full scale meter reading. Impedance balance which precedes phase angle measurements insures equal magnitude of all impedance and resistance voltage vectors

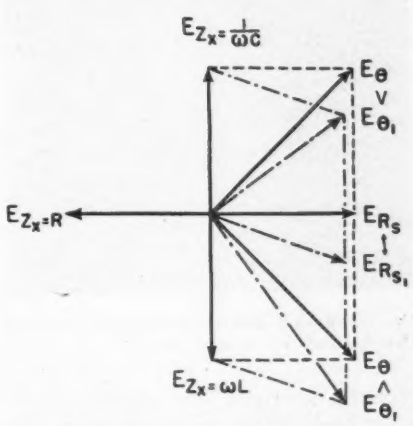


Fig. 15—Method of determining the sign of the phase angle

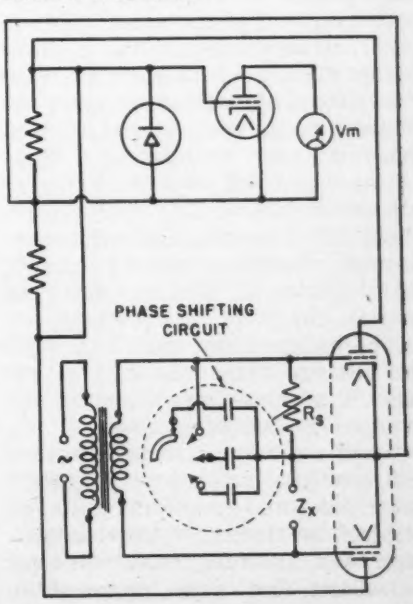
When measuring a network having unknown characteristics, it is also necessary to know the sign of the phase angle, that is, whether the impedance is made up of inductive or capacitive reactance. This is done by shunting a capacitor across the standard resistor so as to produce a shift of known direction in E_{r_s} vector, which will produce a change in the magnitude of the resultant $E\theta$ vector hence a change in phase angle meter deflection (Fig. 15).

Reactance check

The shift in the E_{r_s} vector to $E_{r_{s1}}$ produces a change in the magnitude of the resultant vectors, an increase when measuring an impedance with inductive impedance and a decrease when measuring a capacitive impedance. The effect of this is an upswing of the meter pointer when depressing the "reactance check" button for (+) inductive impedance and a downswing for (—) capacitive impedance.

Because of the instrument's wide impedance and frequency range, three capacitors of different magnitudes are actually used in the instrument for this purpose and are connected into the circuit one after the other by means of a special low capacity push-button switch. Fig. 16, which is the same as Fig. 13 with the addition of this phase shifting circuit, shows schematically the circuit with which the indication of phase angle sign is obtained.

Fig. 16—Manner of selectively including capacitors of three values



ELECTRONIC FORUM

Second National Conference divides attention of engineers between instrumentation, wave propagation and industrial uses

● The program of the second National Electronics Conference held in Chicago at the Edgewater Beach Hotel, September 25 to 28, again drew a nationwide audience. This heavily-attended forum on electronic research, development and application brought out much discussion on all phases of the art. Its appeal was not only to the technically-minded electronic engineer engaged in apparatus and circuit development but also to the engineering executives responsible for guidance and future decisions in their fields.

The Conference was under the guidance of a joint committee sponsored by the Illinois Inst. of Tech., Northwestern Univ. and the U. of Illinois and the local sections of the IRE and the AIEE with cooperation from the Chicago Technical Societies Council.

The forum was opened by an address "Electronics of the Future" by Dr. E. V. Condon (Director, Natl. Bu. Stan.) calling attention to the major fields of industrial activity where electronic methods provide the fundamental principles: radar, loran, television, HF heating, instrumentation and control, mathematical computing devices, mass spectrometers, and new approaches to the study of many new physical phenomena. His review of accomplishments in these fields disclosed that some of these "sidelines" of tube application, are developing to such an extent that they are even now taking a place along the older, mature branches of the electronic art: communication, power rectification and heavy-current control systems. His talk also made it evident that the newer electronic applications are standing on their own feet, with all phases from fundamental research to final installation of the equipment being handled.

During most of the four technical sessions, five groups of papers were presented simultaneously. The subject of electronic instrumentation was accorded three sessions, television and wave propagation, each two sessions, while the subjects of infrared and microwave systems, spectroscopy and medical uses, industrial applications, air navigation systems, theoretical developments, HF heating, radio relay systems, FM, recording, microwave generators, mobile radio communication methods and nuclear physics occupied one session each, with from three to five papers per session.

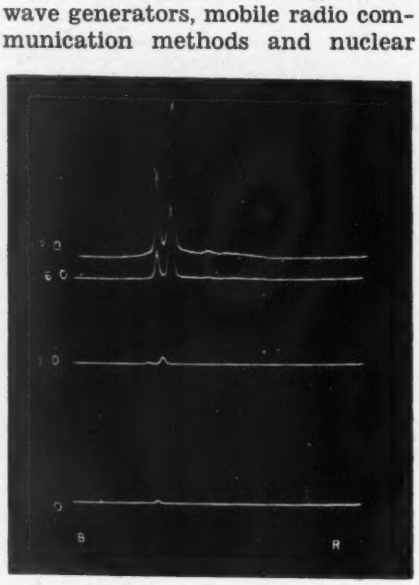


Fig. 2—Spectral analysis of mercury arc lamp after burning 10, 60 and 120 sec.

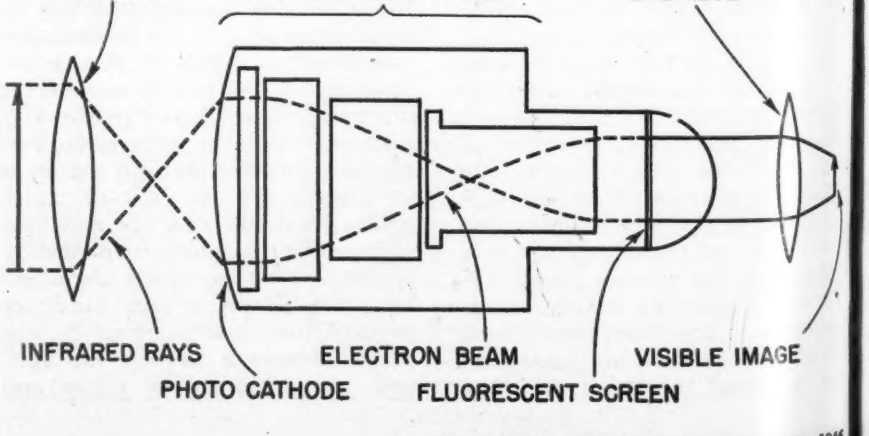
It is not feasible in this brief review to cover all the individual papers, even those highlighted by an unusually large attendance, but a few general notes on random papers will indicate the scope of the program (which, by the way, will be completely covered in the Conference Committees' own Proceedings).

During the session on infrared communication systems, details of war developments were described by W. S. Huxford, for modulating the "light" beam by mechanical optical and electronic methods. The systems of signal modulation of light—flux density changes (intensity), polarization variations, and frequency (color) changes were compared. Following this, methods for detecting optically-transmitted communication signals were described by R. J. Cashman. The infrared-sensitive compounds of thallous sulfide and lead sulfide in special cells were found particularly useful. Models of American and German infrared signalling equipment were demonstrated. Many of these used some variation of the principle shown in Fig. 1.

Recording spectrograph

A cathode ray spectrograph was described by Feldt and Berkley (DuMont), which produces complete spectral distribution curves of an illumination source (or similar tests) at the rate of 250 complete spectra per second. The spectrogram is presented on a cathode-ray tube, as shown in Fig. 2. Here the intensity of a mercury arc lamp is shown just after the current

Fig. 1—Basic principle upon which many models of infrared signalling equipment is arranged



COVERS WIDE FIELD

was turned on (lower curve) and after burning for 10, 60 and 120 seconds after the start (as indicated). The blue and red ends of the spectrum are indicated at the bottom. Continuous recording is possible.

Among the interesting new devices disclosed in the television field, the electrostatic Image Dissector described by Salinger (Farnsworth) showed the use of electrostatic rather than magnetic deflection for scanning (retaining magnetic field focusing, however), in a new form of dissector tube, Fig. 3. The scanning generators are connected by means of a voltage distribution bridge circuit to a circular disposed group of wires (12 in the present tube) inside the tube (only two of which are shown in Fig. 3). The two scanning voltages are applied in different proportions to these wires. The bridge circuit used (Fig. 4) has the connection points to the 12 wires in the "squirrel cage" indicated by numbers.

Microwave heating

Future possibilities of using microwaves in high frequency heating were imaginatively handled by T. P. Kinn and J. Marcum (Westinghouse). Such possible schemes as the passing of bundles of textile filaments continuously through the center of a waveguide carrying microwave power were illustrated by simple drawings designed to stimulate the imagination. One scheme of particular interest for use in a tire factory was a design for curing automobile tires by rotating them inside a large waveguide. Before any of these schemes actually can be used, the development of sufficiently powerful sources at microwave frequencies must be an accomplished fact.

Seven months' intensive exploration of transmission characteristics in the high frequency television band has shown the validity of the selection of these frequencies for this service, according to W. B. Lodge (CBS). He commented on the problem that field intensity contour maps do not reflect the wide variations in signal with frequencies above 30 mc which may occur at times within a relatively few feet. To this end, a new system of obtaining field data and of analyzing and projecting this data so as to provide a quantitative measure of service rendered is being developed and tested.

The use of powdered iron in television deflecting circuits was described by A. W. Friend (RCA-Victor), wherein the problem of the horizontal deflection of electron beams in television systems

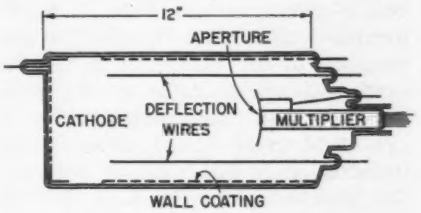


Fig. 3—New form of dissector tube

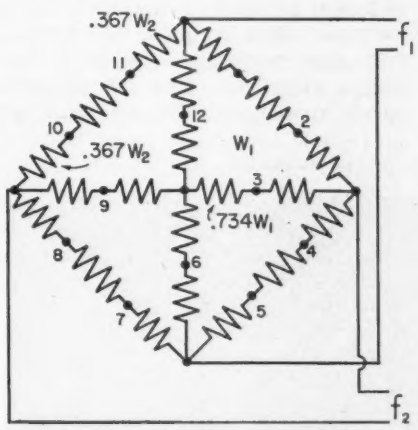


Fig. 4—Voltage distribution network used with new electrostatic image dissector tube

has been aided by the use of transformer and yoke cores molded from powdered iron materials especially compounded for these applications. Low cost materials (special sponge iron) have been developed to produce effective ac permeabilities of between 40 and 250.

Selective attenuation

A demonstration and description of a new system for the reduction of background noise in the reproduction of music from records was given by H. H. Scott (Technology Instruments). By the use of "gate circuits" a system is achieved which is selective with respect to the type of applied signal and consequently tends to automatically attenuate the frequency response characteristics in accordance with certain types of signals while reproducing other types without substantial modification. A system was developed which will transmit with a high degree of fidelity those types of signals normally encountered in vocal and orchestral music, while at the same time discriminating against the usual types of background noise such as needle scratch and motor rumble. This system maintains a balanced dynamic range between lows and highs as was evidenced during demonstrations.

A new concept of the basic theory of the design of television viewing tubes was presented by R. G. E. Hutter (Sylvania Electric Products). This paper disclosed a new mathematical approach to the design of improved electron optical systems for controlling the quality of television images, providing a more complete and useful basis for cathode ray tube design by the elimination of these cut-and-try methods and the reduction of error. The new theory follows the shorter iconal method. Two experimental aids were used, an electrolytic tank and a magnetic field measuring device, to determine the important field design factors needed.

Radioactivity in diagnosis

A valuable application of nuclear physics research deals with the use of radioactive materials in clinical diagnosis and medical therapy, the subject of a paper by J. T. Wilson (Allis Chalmers). It was shown how it is possible to induce artificial radioactivity by means of bombardment with neutrons, alpha particles, protons, and gamma radiation. The use of carbon^{14} and hydrogen^{3} is important in tracer work. The use of such radioactive materials in medical therapy in the clinics of several of our leading medical research institutions was summarized, such as the use of radio-phosphorus and radio-iodine for clinical diagnosis and biological tracer applications.

New laboratory problems connected with communication and industry developments have started new trends in cathode-ray oscillograph design according to the paper by W. L. Gaines (Bell Tel. Labs.). Modern testing requires readily accessible attenuators, delay networks and amplifiers that

(*Continued on page* 111)

SATURABLE REACTORS

By W. D. COCKRELL,
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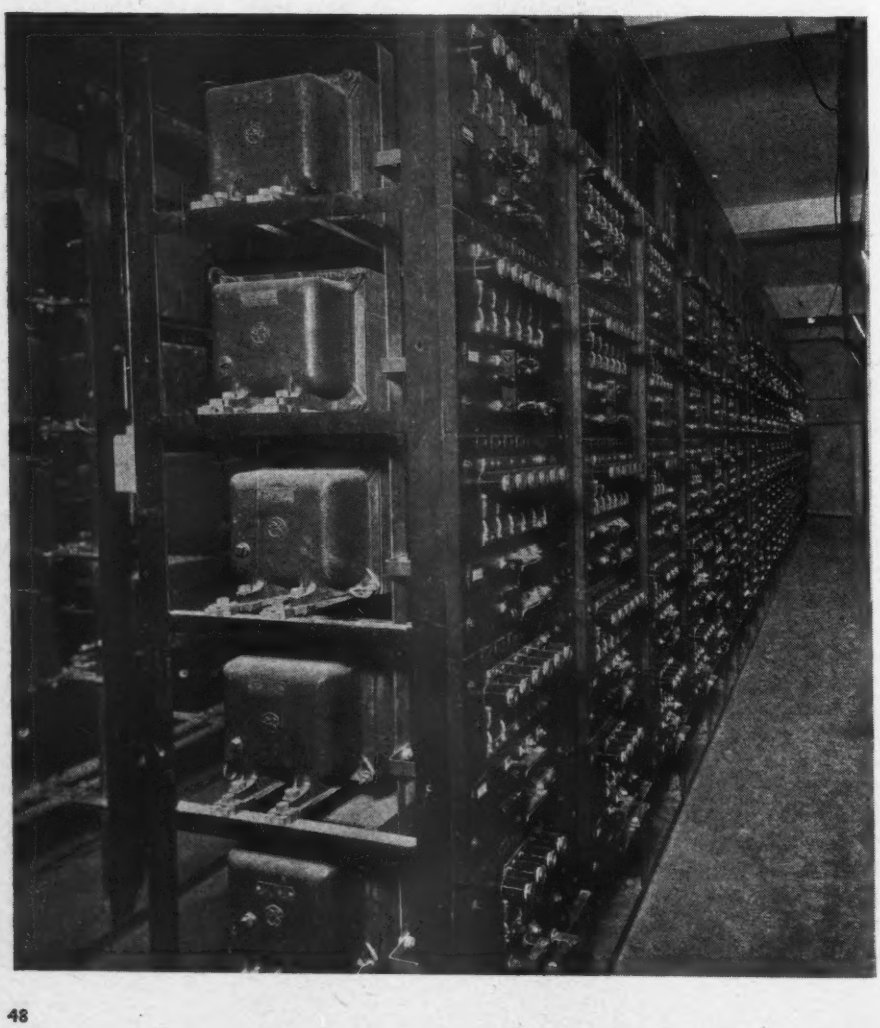
The theory, application and selection of power control reactors utilizing magnetic saturation effects

● The usual method of controlling either dc or ac power, putting a rheostat in series with the load, is fairly satisfactory but incurs a considerable loss of energy in heat. In the case of ac, the rheostat may be replaced by a variable reactance with greatly increased efficiency. At power frequencies, for practical reasons, this reactance is almost always inductive. Wattage losses are minimized, although the power factor of the circuit may be lowered.

The effect of a variable inductive reactor may be changed in a number of ways, as in Fig. 1: A, by mechanical motion in altering the position of an iron core in a solenoid, (which, because of the rapidly changing magnetic structure, is apt to be quite noisy) or in B, the inductance is adjusted by altering the number of turns on a coil by steps, giving a non-continuous adjustment. Also, when large amounts of power are to be controlled, heavy currents must be made and broken and the contactor required becomes expensive and its maintenance must be considered. The two coil reactor, shown at C provides interesting possibilities. It is simply a transformer in which the reactive or resistive load in the secondary reflects back an impedance into the primary circuits. One form of seam welding control uses high voltage thyratrons to short-circuit the secondary winding, thereby switching a high current flow in the primary circuit.

Another form of double coil reactor is called a saturable reactor. As the flux in an iron core increases past a certain point, called the "saturation point", the iron becomes less and less efficient, until, for extreme magnetic overload, the iron is no more effective than the air it replaced.

Fig. 5—A large bank of saturable reactors in a theatre-lighting installation



Permeability curve

If we look at a curve of the ability of the iron to store energy (which we call the "permeability curve") (Fig. 8) against the magnetizing effect, we find that it first rises very fast and then bends over with a rather sharp knee at the point of saturation. From this point on the efficiency falls off quite rapidly.

Normally, iron-core reactors are designed so that they will always operate below the knee of the magnetization curve in the unsaturated portion. By shifting the operation point from the low end to the part of the curve above the knee, the inductive effect will be much smaller, and hence the current will be proportionally larger. This is done electrically, by "preloading" the magnetic field path by a coil supplied with direct current which establishes continuous unidirectional flux in the core. After the core has been preloaded, that is, the energy has been transferred from the electric to the magnetic form, it may be maintained with very little loss, limited mostly to the resistance loss in the dc coil.

or AUTOMATIC CONTROL

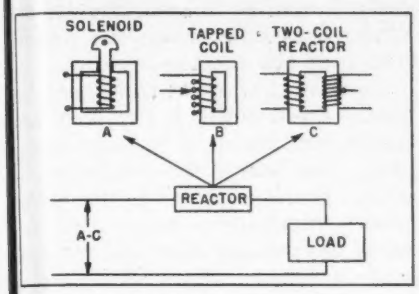


Fig. 1—Variable inductive reactors

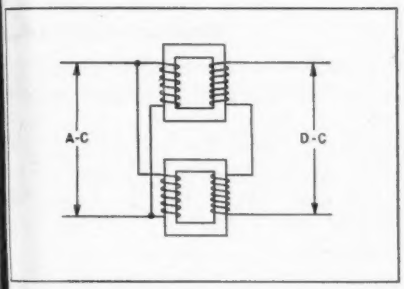


Fig. 2—Two reactor units in a balanced circuit

But when the ac energy is superimposed it finds that the magnetic path already is saturated and hence is much less efficient in inducing a voltage to hold back the current flow. Thus a larger alternating current is permitted to flow to the controlled load.

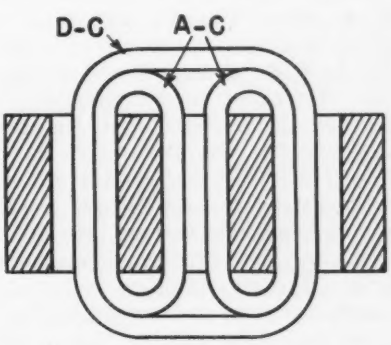
This is a simple principle upon which the saturable reactor works. We simply preload the magnetic path with a dc flux so that the superimposed ac will find its path already saturated and will have less impedance to its flow. By regulating the dc, we thus regulate the ac power flow to the connected load.*

Reactor Principles

In its simplest form, a saturable reactor is composed of a closed iron core, on one side of which is wound the ac winding, and on the other side is the winding carrying the dc for saturation. This is a workable device and has been used, but it has one very obvious disadvantage. We have here, in effect, an ac transformer, with, as is usually the case, many more turns on the dc winding than on the ac winding. A very high ac voltage will be induced in the dc winding. Since it is the direct current only that determines the preloading or saturation, we might ignore this induced ac voltage and hold the direct current flow constant by means of an external inductance in the dc circuit. But the dc winding and external inductance must be insulated for the high voltage.

Another solution might be to place a large capacitor across the dc winding terminals. Furthermore, we must saturate the iron core sufficiently to prevent even the maximum reverse alternating current from demagnetizing it.

But rather than go to these extremes, it has been found much more desirable to split either the ac or dc coil into two parts in order that this transformer action will be balanced and cancelled. One way to do this is to provide two complete transformer units so that the ac windings are acting together and the dc windings are opposed as in Fig. 2. In this way, although the high voltages appear across the individual dc coils, the outgoing terminals should show no ac voltage. This type of construction makes possible the use of some of the new oriented-grain magnetic material such as cold rolled silicon steel, and is used to some extent at the present time. The maximum voltage present may be reduced by splitting the dc coils into sections and balancing the individual sections.



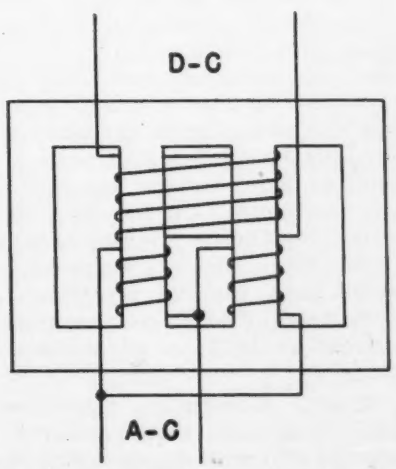


Fig. 4—The four-legged core saturable reactor

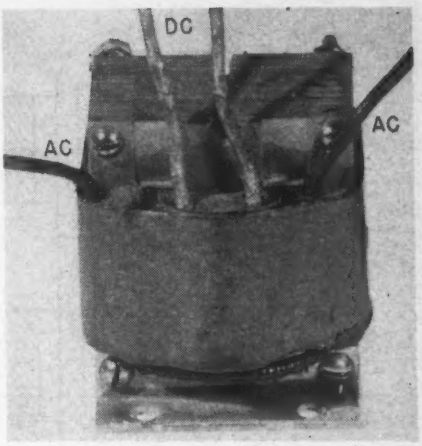


Fig. 3—The three-legged core saturable reactor

However, the solution which many find to be more desirable is that of balancing the magnetic forces rather than balancing the electrical forces. This is done by the correct design of the magnetic paths and the proper relation of the ac and dc coils to them. Let us consider first the simple form of three-legged reactor which can be built on standard transformer punchings. In this form, the ac winding is split into two parts and is placed on the outside legs whereas the dc winding encloses the center leg. Fig. 3 shows a small three-legged unit.

Control method

Here the alternating current flowing in one coil at any instant produces a magnetic effect which tends to drive a flux around the outside path in the same direction as the second ac coil. However, in the center leg the magnetizing effects of the two ac coils are opposed and hence no transformer action can take place in the dc coil.

When the dc winding is energized, its constant flux flows through the center leg, out and down through each of the outside legs, and returns again to the center. When the ac flux is now superimposed on this dc flux, it finds the path saturated and the impedance low.

*The quantitative design of a saturable reactor has been covered by H. Holubow in the March 1945 issue of Electronic Industries.

Since the ac flux path through the iron core is now not much better than that through air, much of the ac magnetic flux is spread into the air outside of the core and hence we have considerable stray flux. The effect of this stray flux

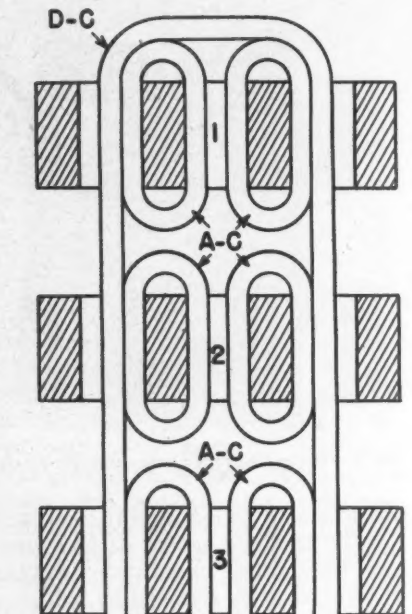


Fig. 6—A three-phase unit saturable reactor

on neighboring circuits is one of the disadvantages of this type of reactor.

The 4-legged reactor, as seen in Fig. 4, has ac coils wound on the two center legs and the dc coil wound over both. This makes a very efficient form of reactor since the ac and dc leakage magnetic flux is kept to a minimum. Also, the outside legs act as a magnetic shield for the device and there is very little stray field outside of the unit, thus making it possible to install a number of such reactors in a small space without interference. This is quite often necessary in large installations, such as might be required for multiple laboratory furnaces, a bank of process motors, or the many lighting circuits required in a theatre-lighting installation, such as Fig. 5.

Practically all of the power-type saturable reactors from ½ kva up to 75 kva rating are built with the four-legged construction.

Three-phase reactors

If an application of saturable reactors to three-phase power load is required, three separate reactors can be used with the dc windings in series, or a composite reactor may be constructed, using three sets of cores and ac windings and with a single elongated dc winding surrounding all three cores. A cross-section of this type is shown in Fig. 6.

The question whether the halves into which the windings have been divided should be connected in series or in parallel also deserves serious attention. In those systems which use the divided dc winding, the halves must be connected in series, for in a parallel connection of the dc windings the induced ac voltage would be additive, and the heavy short-circuit currents flowing would neutralize the magnetic effect. On the other hand, in the ac winding we do have the choice of whether the halves will be connected in series or in parallel. The two types of connections are shown in Fig. 7.

With the series connection arrangement the ac voltage must be applied to force the current through both the series coils. If we assume the dc saturation to be equal to that of the peak ac magnetic flux, it will be seen that for one coil the ac flux will add and thus find a saturated condition, but in the other coil the ac flux will subtract from the dc and hence will find an unsaturated path and high impedance.

The reverse is true when the ac voltage reverses. Thus, for each half wave, when the dc saturation is equal to the ac value, we have still one half of the impedance remaining. If we are to rid ourselves of this remaining impedance, we must apply double the amount of dc to obtain a saturation which cannot be neutralized even by the maximum ac reverse current. So, for a series ac winding approximately twice the dc ampere turns are needed for the full saturation effect.

Let us next consider the action of the parallel ac windings. Here when the dc presaturation flux is equal to the peak ac value, we find that one path will now have low reactance as the ac flux is superimposed and most of the alternating current for this half wave will tend to flow through this half of the ac winding. On the other half cycle, the other ac winding is saturated. When the dc is removed, we again have the full reactance of each winding and the alternating current is held to its minimum value.

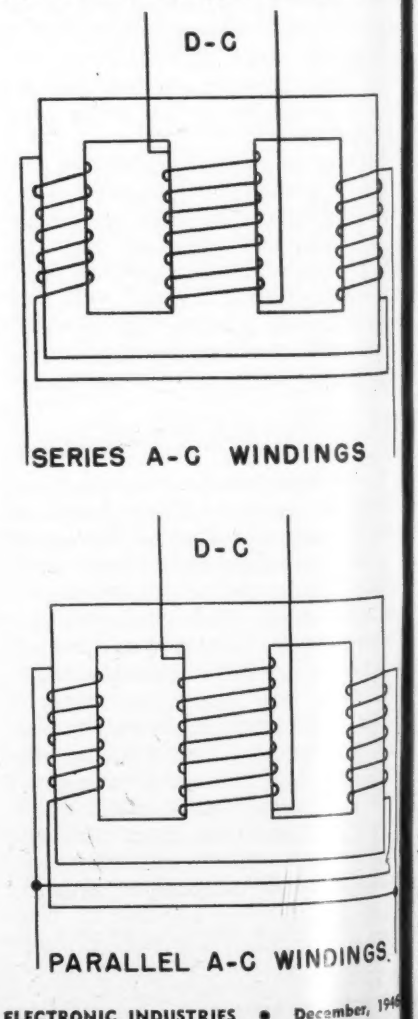
Under unsaturated conditions, coils in parallel, with a lower reactance will now handle twice the current so that the kva and the dc power required for saturation are unchanged. We have exchanged unsaturated reactive impedance for a larger current rating. When the ac coils are in parallel, they form a closed-circuit loop which tends to trap some of the magnetic energy when a change in saturation is desired. This slows down the control action of the reactor.

To sum up: for control operation where small power is involved, and maximum speed of action is desired, the series ac connection is often found; however, for large power installations where the currents are greater and the required impedances are lower, the parallel ac windings are most often used.

Reactor operation

Perhaps we can understand the operation of the saturable reactor best by reviewing Fig. 8, a magnetizing curve for the core material. Although only one side of the complete magnetizing curve is shown, the reactor is so built that the action is always symmetrical and both halves of the ac wave are treated exactly alike. With no saturation, the reactor is designed to

Fig. 7—The three-legged saturable reactor



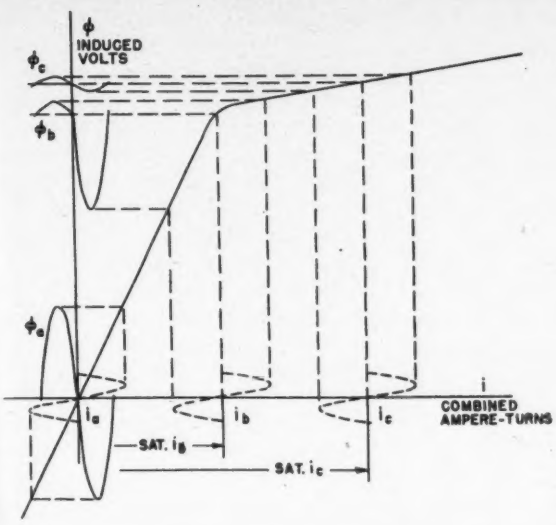


Fig. 8—The effect of close saturation

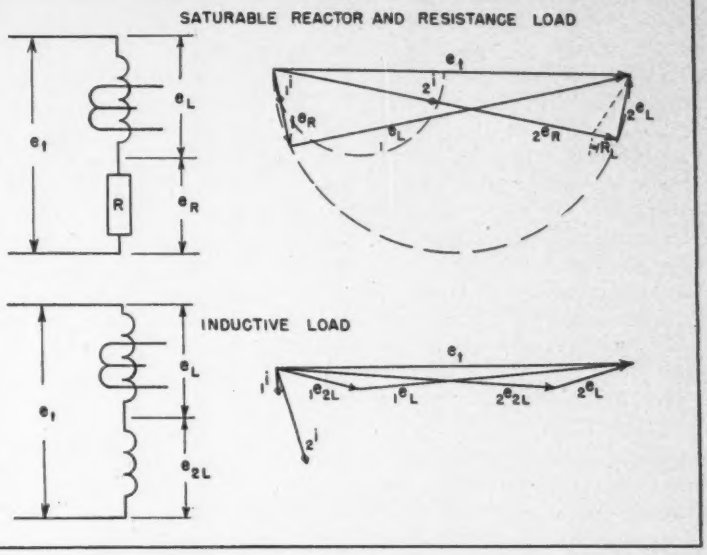


Fig. 9—The vector relations for a resistance load and an inductive load

work within its saturation region and thus operates as any other iron-core reactor, as in condition A. If a sine-wave alternating current flows, a sine-wave ac voltage is induced.

At the other extreme, at C, if the reactor is fully saturated, the ac voltage is again associated with a fairly smooth sine-shaped alternating-current wave of much larger magnitude. However, it is in the midrange condition where the combination of ac and dc flux move on both sides of the saturation knee that the most interesting results are obtained. The shape of the current wave here may look quite odd but it is easily worked out by a step-by-step method, remembering always that as the saturation increases, the current for a given voltage will be larger.

It can be seen that the current through the load and through the reactor has a very pronounced third harmonic. This distorted wave shape at midrange is a very important factor in determining whether a saturable reactor will be suitable for a particular application.

The actual shape of the wave and the percentage of third harmonic depends much on the steepness of the magnetization curve, the sharpness of the knee, core hysteresis effect, and on the characteristics of the connected load. Capacitors and other forms of filtering on the input side may be used to minimize the third harmonic which might otherwise be fed back into the power supply.

The commonest load controlled by a saturable reactor is a resistive load such as a heating element or incandescent lamp. An inductance, instead of absorbing energy, permits current to flow out of phase with the applied voltage or, as we say, with a 90-deg lagging power factor. If it is connected in series with the resistive load, which absorbs the electric energy directly as heat and thus consumes a current in phase with the voltage across it, we find that the voltage across the reactor cannot be subtracted directly from the supply voltage, but must be done vectorially as in Fig. 9. The path of two vectors at 90 deg with each other appears as a semicircle with the supply voltage as the diameter. This permits us to see at a glance the practical range over which the load can be controlled.

Reactor drop

To obtain full voltage across the load, it would be necessary to have zero voltage across the reactor. This is obviously impossible, but if we will content ourselves with 95% of the total voltage across the resistance load, we see that we do not need to limit our reactor drop to 5%, but to the vectorial quantity which is 31% of the applied voltage. This is quite easy to obtain. However, we must not forget that there is also a small resistance loss within the ac winding of the reactor, and this too must be subtracted from our load voltage.

On the other hand, at the low-current end, if we attempt to cut the input voltage to the load down to 10%, it is necessary to increase the impedance of the reactor to hold back a voltage equal to 99% of the supply voltage. This is more difficult to do.

The load considered here was the resistive type in which the electric energy was changed to heat, or, perhaps, absorbed in some chemical process or in a rectifier. Sometimes, however, we wish to use the saturable reactor to supply power to a fairly high inductive load such as a motor or an ac magnet. In this case it is necessary to add the voltage vectors almost in a straight line as shown in Fig. 9, and it is thus necessary either to be content with a smaller portion of the total voltage applied to the load or to design our reactor for greater saturation in order that its minimum impedance may be made smaller. For this reason, the control of an inductive load is not usually as efficient as the control of the resistive load described above.

A practical design of reactor will control the resistance load about as follows: With no saturation, about 8% of the line voltage will appear across the load. At full saturation, about 96% of the line voltage appears across the load. Under such conditions the power ratio, that is, the ratio of dc power necessary for excitation to the ac power controlled, ranges from 25 times at ½ kva (that is, 1/25th of 500 or 20 watts dc required for saturation) to a power ratio of 111 or 135 watts dc for a 15-kva reactor.

On the other hand, if the reactor can be designed so that only 90% of the voltage need appear across the load, only about 40% of this dc will be required for saturation and the power ratio goes up 2½ times. In other words, only 8 watts dc would be required for the ½-kva reactor.

When the reactor is unsaturated, the circuit current is low and although the power factor is also quite low, perhaps only 5%, the ad-

ditional lagging kva in the system is negligible. When the reactor is fully saturated, the largest current occurs but the power factor has now risen perhaps to 97% as the power is consumed by the resistance load. If the installation is large enough and a partial load is common, it may be desirable to compensate for some of the lagging power factor by the use of capacitors connected across the line. These capacitors also have the effect, as we mentioned previously, of preventing the higher harmonics from being fed back into the power supply.

Since, in addition to the dc winding losses, we have only the copper losses in the ac winding and some core losses due to the hysteresis in the iron, our efficiency is quite high. Even at 10% saturation it has risen to 85%, and at 20% saturation it is up to 95%. Above 40% saturation, the efficiency remains at approximately 98%.

In a similar manner, the power factor has risen to better than 50% with 20% saturation and is 85% at 40% saturation, rising to better than 95-97% for values greater than 60% saturation.

The physical size of a saturable reactor is comparable to a standard two-winding single-phase transformer of equivalent rating. For example, power reactors from ½ to 5 kva use a four-legged punching approximately 8 in. by 10 in. About 1 in. of stacking is required for each kva. A larger size punching, 11 in. by 14 in., used on the 5 to 30 kva sizes, uses about 1 in. of stacking for each 2 kva. Control reactors for tube grid circuits may be much smaller, as the one in Fig. 3.

Control element

Larger sizes up to 75 kva usually are made from standard L and flat punchings. The largest size reactors, having parallel ac windings, may have a time constant of perhaps three seconds in response. They are used principally for the control of electric furnaces and other large thermal loads in which fast response is not necessary.

As a control element in electric or electronic circuits, the saturable reactor offers many advantages.

First, it provides control in an ac circuit by means of a direct current. Control in the opposite sense, that is, the control of dc from ac circuits is comparatively simple, since much of our dc power is obtained from ac by means of electronic or dry-plate rectifiers or motor-generator sets. But the saturable reactor is one of the few means by which an ac circuit can be controlled directly by dc.

Second, the saturable reactor provides a means of insulating the dc control from the ac circuit. In this respect it has the advantage over electronic circuits in which a dc voltage is used to change the tube grid bias. The insulation between control and power circuits often permits considerable savings over the extra components required in other types of control.

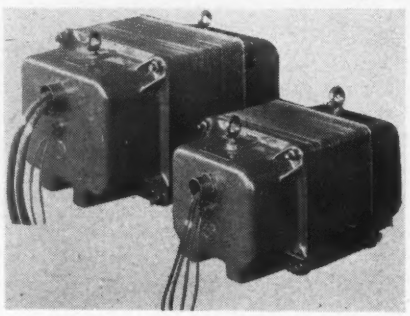


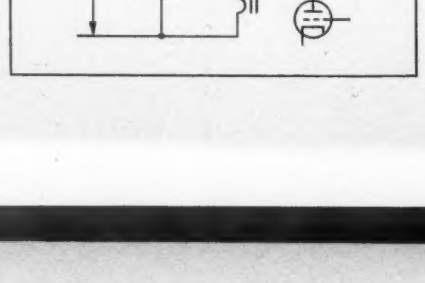
Fig. 10—Power saturable reactors

Third, since the control is through the magnetic path, we are able to vary the volts and amperes in both of our dc and ac circuits as desired so long as the proper power ratio is maintained.

Fourth, and perhaps most important of all, we are able to obtain a large power ratio or amplification between the dc used for control and the ac power which is controlled.

A possible form of control uses two saturable reactors with ac windings connected opposed so that the fundamental component of ac is balanced out and only the second harmonics left to be amplified as an indication of the dc saturating current. However, there are few of this type of control in commercial service. Perhaps the most widely known use of this type of operation is that of the "Flux-gate compass" and the "Magnesyn" form of remote-indicating equipment. These use the earth's magnetic field and that of a permanent magnet respectively for saturation.

Fig. 12—A circuit for indicating lights



Perhaps the simplest method for obtaining dc for saturation is by the use of dry-plate rectifiers operated from the ac bus. Since the power required is usually small, a resistance-type potentiometer may be used or one of the small autotransformers of the "Variac" type. In other cases, the necessary dc can often be obtained or rectified from the process to be controlled.

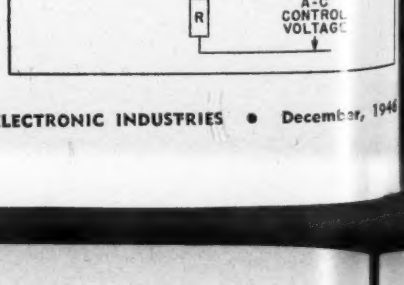
Saturable reactors have been made small enough and sensitive enough to be operated from such a dc source as thermocouples and blocking-layer photocells. But in attempting to operate the reactors from such small amounts of power, there are two important effects which may interfere with proper action. The first is the effect of stray fields, even the earth's magnetic field, which may cause false results at these low flux densities unless proper shielding and protection is provided. The second is the effect of residual magnetism present in all iron, and especially noticeable when low magnetizing forces are to be considered.

Saturable reactors are often used as the connecting link between a vacuum tube or pliotron amplifier and a thyratron output stage. For such service the small receiving-type tubes are quite capable of supplying the required dc saturation current. Since the interelectrode space within the tube acts as a high resistance, the dc circuit has fast response. This is especially true for pentode tubes which have an extremely high effective resistance for changes in current. In these circuits, it is sometimes necessary to supply a protective resistance or Thyrite in parallel with the dc coil to prevent damage due to rapid energy release.

A simple form of pliotron excitation is that of Fig. 14, which shows the circuit used with photoelectric input for controlling a fractional-horsepower motor which winds wire at a constant tension.

In Fig. 15 two pilotrons in a cathode-follower, or "long-tailed-pair" circuit, are used with two saturable

Fig. 13—Multiple feed to a common pilot



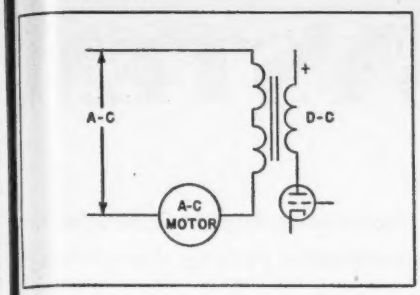


Fig. 14—Simple vacuum tube and saturable reactor control of fractional-hp motor

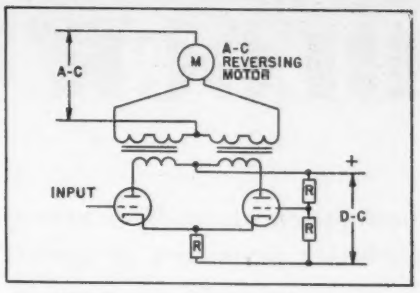


Fig. 15—The "long-tailed pair" and two reactors for reversing motor control

reactors to provide reversing control in a simple servo or follow-up control.

First let us consider those systems in which the saturable reactor forms a part of the control chain and does not itself control the output power or in which the output from the saturable-reactor circuit network is only a few watts.

One of the simplest saturable-reactor circuits is that shown in Fig. 12, which has been used for the operation of tuning-indicator lights on radios. It consists essentially of two red lamps in series and two green lamps in parallel with a saturable reactor in parallel with the red lamps. When the reactor is unsaturated, the major part of the applied voltage appears across the red lamps, lighting them brilliantly. However, as the reactor is saturated by current from the circuit, the red lamps are shunted by the low reactor impedance and the green lamps are lit. This is a possible indicating circuit for many processes which vary with the dc power signals.

In large theatre-lighting installations, it is often desirable to fade smoothly the lighting effects from one scene into another. In addition, in some installations as many as five scenes can be preset in advance, then selected and brought forth smoothly by fading. A circuit to do this is shown in Fig. 13. The voltage across the common resistor R is the reference or pilot voltage which determines the light intensity of one circuit. The control power is fed to this resistor from each of the reactors in turn as it is saturated. Although the reactor impedance in the saturated and unsaturated conditions may have a ratio of as much as 20 or 30 to 1, this ratio may be increased many times by the proper use of series and parallel resonance between the reactor impedance and that of series and parallel capacitors.

This same system is, of course, applicable to other forms of control in which the output must be blended smoothly from a number of different control points.

Regenerative reactors

Although the power ratio between the controlling dc and the ac power is large, even greater ratios can be obtained by rectifying a small amount of the ac output and connecting it in parallel with the dc control power. By careful adjustment of this feedback power, most of the dc required for saturation can be supplied in this manner, and the control dc circuit then needs supply only the small remainder. Or in some cases, more-than-sufficient dc can be supplied so that a "lock-in" action takes place.

Once a small amount of saturation power has been applied to the dc control winding, the process continues on to full saturation due to the dc feedback. In this case, in order to reverse the action, the control dc must be reversed so that its magnetizing action opposes that of the feedback and thus starts the desaturating cycle. This circuit provides a very definite snapaction which may be desirable for large magnets and contactors. For example, for large contactors, control power would be needed only when the contactor is being picked up or dropped out.

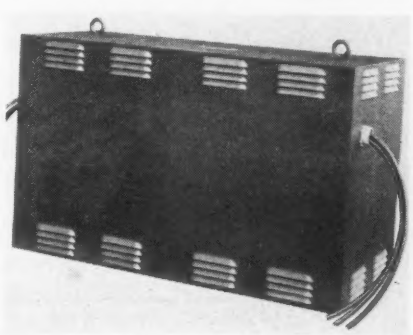


Fig. 11—Larger saturable reactor up to 75 kva

In conclusion, a saturable reactor provides a wide range of control with smooth adjustment over the entire range. It is very efficient even at light loads. It is a compact, sturdy unit having no moving parts to wear and making no more noise than the ordinary single-phase transformer. The voltage drop in the reactor at full saturation can be made small, permitting 95% or more of the voltage to be applied to the load.

The dc control power required is small and can be obtained from any reasonable combination of current and voltage as available. The control current can readily be obtained from tube amplifiers. The control and power circuits are electrically separate. Finally because of the efficient operation of both the reactor and the small amount of control power needed, both the control and power elements are quite small and easily located.

REFERENCE READING

Saturable Reactors—Design

Boyajian, A., "Theory of D-c Excited Iron-Core Reactors and Regulators", AIEE Trans., v. 24, pp. 919-936, 1924.

Blake, D. C., "Application of the Saturated-Core Reactor and Regulators", AIEE Trans., v. 43, pp. 937-940, 1924.

Hanna, C. R., "Design of Reactances and Transformers which Carry Direct Current", AIEE Journal, v. 46, p. 128-131, Feb. 1927.

Suits, C. G., "Studies in Non-Linear Circuits", Trans. AIEE, Part 2, June 1931.

Gussakov, V. D., "Inductance of D-c Saturable Reactors" (in Russian), Elektrichestvo, p. 47-50, 1st Oct. 1935.

Brown, M. J., "Design of Saturable Reactors", Radio News, v. 16, p. 540-41, Mar. 1935.

Pender, H., Electrical Engineer's Handbook, 2 v. 1936 "Action of D-c MMF with A-c MMF", v. 1, p. 4-20, 423.

Aggers, C. V. and Pakala, W. E., "Direct Current Controlled Reactors", Elec. Journal, v. 34, p. 55-59, Feb. 1937.

Lamm, U., "Transductor and Its Applications", ASEA Journal, v. 16, p. 66-80 May-June 1939 (Comprehensive treatment of Swedish practice), Tekn. Tidski, v. 7, pp. 189-193, May 4, 1940 (Swedish).

Wentz, E. C., "Saturable Core Reactors Now Smaller", Westinghouse Engineer, v. 3, p. 115-117, Nov. 1943.

Holubow, Harry, "D-c Saturable Reactors for Control Purposes", Electronic Industries, v. 4, pp. 76-79, March 1945.

Articles in German

Wasserah, T., Qualitative Theory, Arch. for Elek. v. 31, No. 12, pp. 814-821, 1937.

Hauffe, G., Qualitative Theory, Arch. for Elek. v. 33, No. 1, p. 41-47, 1939.

Hartel, W., Approximate Calculations, Arch. for Elek., v. 33 No. 9, pp. 585-592, 1939.

Hartel, W., Predicting Harmonics, Arch. for Elek., v. 36 No. 9, pp. 556-572, 1942.

Saturable Reactors—Application

Suits, C. G., "Flashing Lights Without Moving Parts", Elec. World, v. 99, p. 1098-99, June 25, 1932; Elec. World, v. 101, p. 321, Mar. 11, 1933.

Anon. "Rectifier and Reactor Combinations" Power Plant Engrg., v. 37, p. 219-20, May 1933.

Simpson, W. P., "An Identification Tag for the Airport", G. E. Review, v. 36, p. 326, July 1933. (Saturable Reactors Dim Boundary Lights)

Austin, T. M. and Cooper, F. W., "Two Applications of Non-Linear Circuits", Elec. Engrg., v. 53, p. 293-300, Feb. 1934. (A Voltage Regulator Using a Saturable Reactor)

Gulliksen, F. H., "Electron Tube Motor Control", Electronics, v. 7, p. 179, June 1934.

Chambers, D. C. "Application of Electron Tubes in Industry", Electrical Engineering, v. 54, p. 82, Jan. 1935.

McCandless, S. R. and Wolff, F. M., "Electrical Control for Varying Lighting Intensities", Illum. Engrg., Soc. Trans., v. 31, p. 41-68, Jan. 1936.

Anon. "Reactance Amplifiers", Electronics, v. 10, p. 28-30, Oct. 1937.

Way, K. J., "Voltage Regulators Using Magnetic Saturation", Electronics, v. 10, p. 14-16, July 1937 (includes a bibliography).

Smith, D. W., "Magnesyn Remote Reading Compass", Aeronautical Engrg. Review, p. 31, May 1943.

THE BLOCK SYSTEM

Modeled on railroad block signalling practice, system using interrogation and reply pulse technics promises to provide automatic safety on airways

• Airlines are threatened with choking on their own speed! Flying 3 to 7 miles per minute, planes not only need lots of elbow room, but need some automatic danger indication even along their normal travel routes to keep from colliding. And it must be remembered that collisions are possible from six directions in a cubic medium!

An interesting development promising to solve this problem is the block system of control proposed by the General Railway Signal Co. and based on principles of railway block control.

In brief, the idea is to set up on the ground interrogator controllers at intervals along an airway beacon. These can be located anywhere and their distance apart can be regulated by the traffic density along the route. Each ground station blocks out for itself a cylinder possibly 30 miles in diameter and of unlimited height. It proceeds to send out pulses to interrogate any airplane within this cylinder and to obtain a response which it records (Fig. 1). During the entire time the airplane is in this cylindrical block its movement and altitude are known and recorded by the ground station and any other airplane, provided it is properly equipped, would receive a danger signal if it attempted to fly into the same block at the same altitude.

Pulses used

As in television technic, the ground station sends out first a synchronizing pulse. After an interval of 1,000 microseconds the first interrogation pulse is sent out. This pulse is designed to interrogate airplanes at the 1,000 ft. level. After another 1,000 microseconds the second pulse is sent out to interrogate planes at the 2,000-ft. level. This process is repeated for as many altitudes as desired, say 16, so that an entire interrogation sequence for up to 16,000 feet takes place in 18,000 microseconds and then repeats (Fig. 2).

The airplane is equipped with a transponder controlled by an altimeter. If the plane is at 1,000 feet, the altimeter regulates the transponder so that it will be operative only for pulses received more than 1,000 but less than 2,000 microseconds after the synchronizing pulse. Thus at the 1,000-ft. altitude the plane will only give responses to the first interrogation pulse.

Likewise the ground station receiver which gathers in the replies from the airplanes is equipped with a gate circuit which opens after the interrogation pulse and closes after a predetermined time so that planes too distant will not be heard. For example if a 30-mile diameter block is being controlled, the gate would remain open for 161 microseconds, the time needed for a signal to travel out 15 miles, trigger the airplane transponder and be sent back to the ground station. Any signal received later than this would be coming from a more distant plane and would not affect the ground station receiving set.

It is obvious that the information obtained in this way must be properly organized and presented to the pilots of planes in the block, arriving and departing.

Suppose 3 adjacent blocks—A, B and C (Fig. 3). Assume planes in A and B. The fact that block C is unoccupied must be sent from the C to the B ground station

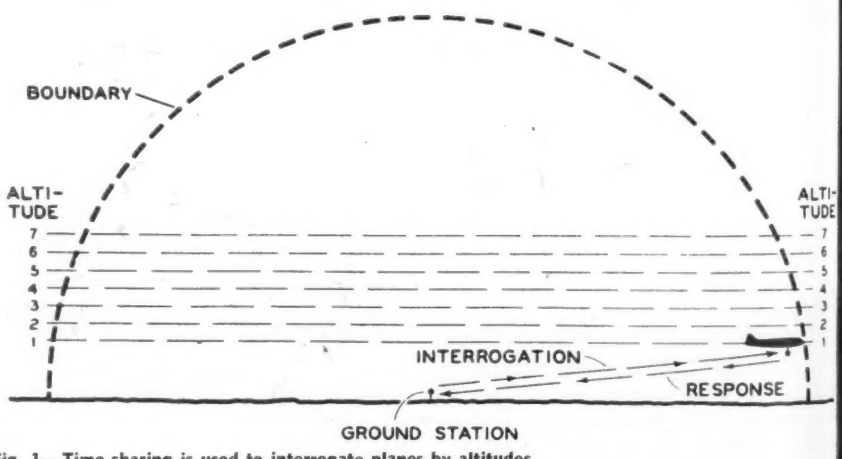
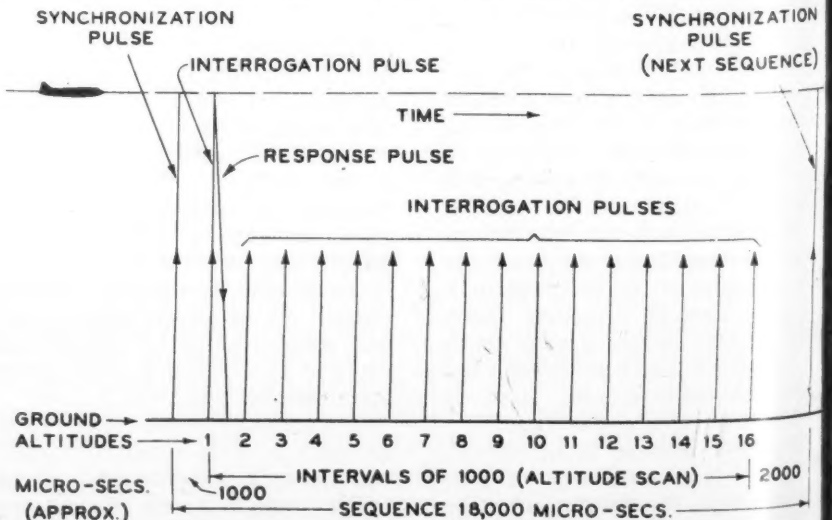


Fig. 1—Time sharing is used to interrogate planes by altitudes

Fig. 2—After a synchronizing pulse, interrogation pulses occur at 1000 microsecond interval



FOR AIRWAY CONTROL

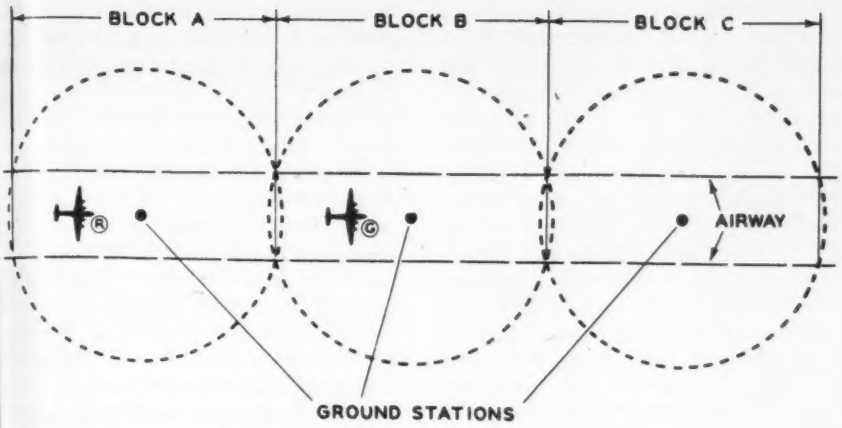


Fig. 3—Disposition of ground stations along an airway to create separate blocks

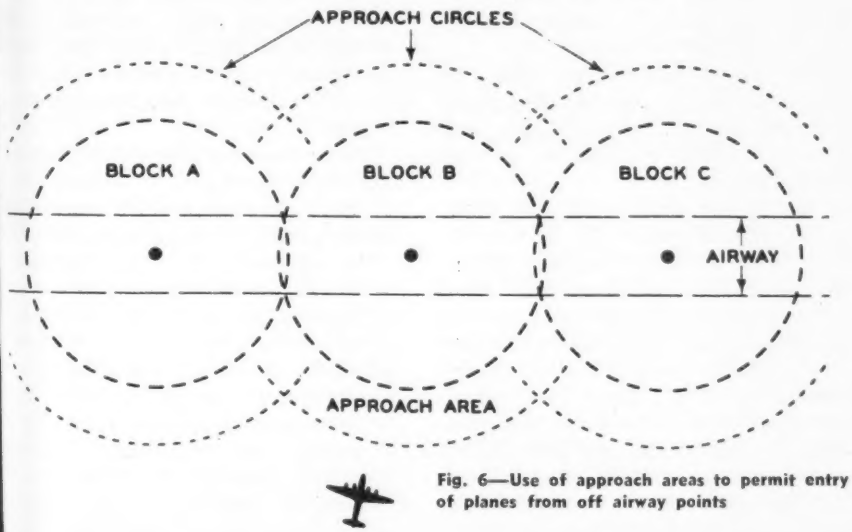


Fig. 6—Use of approach areas to permit entry of planes from off airway points

either by wire or radio link and transmitted from B to planes under its temporary control. Plane B will receive this information by means of a green light in the cockpit meaning "proceed". Plane A on the other hand will have a red signal because plane B is in the next consecutive block.

This system called "two indication signalling" may be extended to "three indication signalling" by providing for a yellow warning signal when an obstructing plane is still two blocks away.

In addition to providing clearance warning on a given level, it is necessary to have a scheme for clearance up and down when a plane wishes to ascend or descend. It is clear that if a plane in block B wishes to ascend from 5,000 to 6,000 feet, blocks A, B and C should all be clear at 6,000 feet (Fig. 4). This is because the plane may move upward entirely in block B or go into C. Furthermore another plane may be moving from A to B.

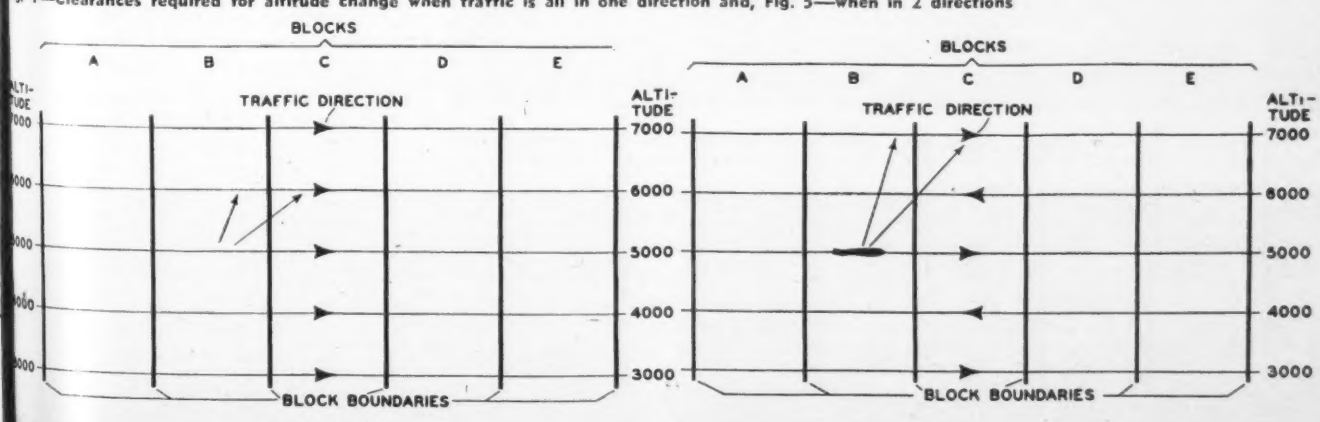
To find out the status of these blocks the pilot pushes a button and if all is clear receives a signal in the form of an illuminated green arrow marked "ascent" together with the green cruising signal. The system further provides that if Block C ahead is not clear either at 5,000 or 6,000 ft. the green arrow will show together with a red cruising signal. This indicates restricted ascent to be completed entirely in Block B. Furthermore the ground station reserves the B 6,000 ft. level for the plane in question by giving all other planes approaching that block and level a red signal. Movement of the ascending plane to the desired level automatically cancels this reserve signal. But if the ascending pilot changes his mind about climbing he can "cancel" his "reservation" by pushing a "cancel" button.

If alternate altitudes of an airway carry traffic in opposite directions the pilot would not wish to ascend to 6,000 ft. from 5,000 ft. but would go on to 7,000 ft. The principles of operation would be exactly similar, however, though more complicated as more altitudes would have to be explored (Fig. 5).

Furthermore the system lends itself to ground instructions to flying planes since an ascent or descent signal could be caused to appear to a designated pilot by ground control.

To provide for entry to the air-

Fig. 4—Clearances required for altitude change when traffic is all in one direction and, Fig. 5—when in 2 directions



way from the side an extended diameter cylindrical block is designated as an approach area (Fig. 6). As an approaching pilot flies toward a ground station, say B, he has displayed before him the condition of Blocks A and B by an ap-

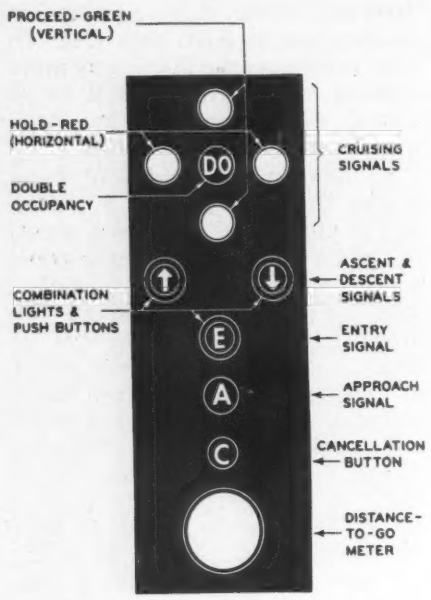


Fig. 7—The cockpit signal

proach signal. Of course he has to tune to the airway frequency to receive this. Should he wish to enter he pushes an entry button thereby requesting permission to enter. When he is in the approach area such request will be answered by a grant or a refusal as conditions warrant. Entry authorization locks out any other entry. The pilot may also "look at" other altitudes.

Now that the basic principles have been explained it is necessary to consider how to prevent confusion along an airway due to pulses from several ground stations being heard in one plane. This is done by having adjacent ground stations send out synchronizing pulses of different widths. Block A for example will have a short pulse, B a long one, C again a short one and so on. The pulse first received then, be it long or short, will control the plane signals, causing them to answer to the nearer ground station (Fig. 8).

Code signals

Furthermore, since it is necessary to send instructions such as "Proceed", "Hold", "Ascent", "Descent", "Entry", "Double Occupancy" (of one block), it is advisable to form a code. This can be done by using four signal sequences each 18,000 microseconds long such as were described earlier to form a complete "Signal Cycle" 72,000 microseconds long. With a four digit code like this it is possible to transmit fifteen different signals.

To effectuate this system six different pulse widths are used. The first four are used respectively in the four signal sequences which constitute a signal cycle. Thus pulse width 1 always appears in sequence 1 and so on. In addition pulse width 5 is used for checking and 6 as a blank. As a result sequence 1 could have in it pulse widths 1 or 6, sequence 2 could have 2 or 6, etc. The apparatus on the airplane is equipped with five relays each of which responds to a pulse of given width. Pulse width 1 will energize relay 1R. Pulse width 2 will pick up relay 2R. However, pulse width 6 will not. Hence if code 1 consisting of the ordered group of pulses 1, 6, 6, 6 is received in the plane only relay 1R will be actuated.

The effect of having relay 1R energized is to cause the plane transponder to radiate a response pulse of width to energize ground relay 1RP.

On the ground there are four code origin relays 1P, 2P, 3P and 4P. Also there are four response relays 1RP, 2RP, 3RP and 4RP.

The general scheme of operation is that a pulse originating on the ground must cause the plane to repeat the correct pulse. If this happens for each code pulse a check pulse is sent from the ground to close a check relay on the plane.

In sequence 2, since code origin relay 2P on the ground is not energized, the ground radiates blank pulse 6. This does not pick up plane relay 2R. The transponder then does not radiate the proper pulse to pick up ground relay 2RP. The connections are arranged so that circuits are closed only if the code origin relay P and its associated response relay RP are both actuated or both left de-energized. This is then a check circuit. If the circuit is in correct working order current flows through the various ground relay contacts causing the ground station to send out check pulse 5 of characteristic width. This energizes check relay 5R on the plane thereby finally completing the circuit to light the desired signal.

An important advantage of this system is that it can have superimposed upon it a central traffic control which would be in a position to make such changes in the indications being given to planes as seemed warranted in the light of any special conditions which might exist.

It is even possible to extend the system to provide for flying along multiple lateral traffic lanes at a single altitude. Thus along an east-west airway, Fig. 9, eastbound traffic would be flying south of and westbound traffic north of the line of beacons. To do this it would be only necessary to assign two interrogation channels for each altitude and to provide planes with a means for switching to either group of channels according to direction of flight.

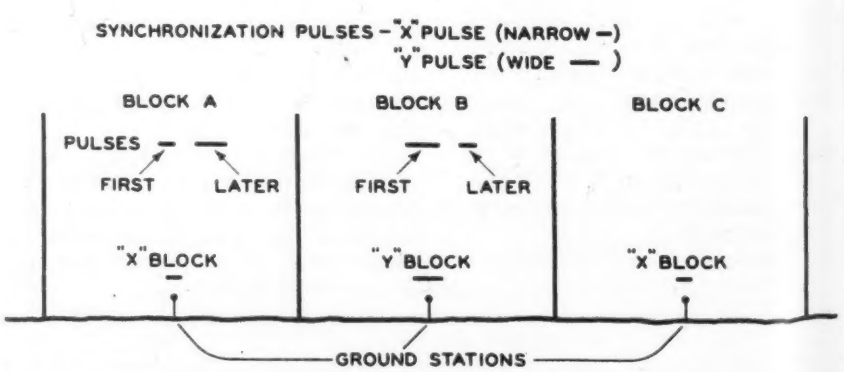
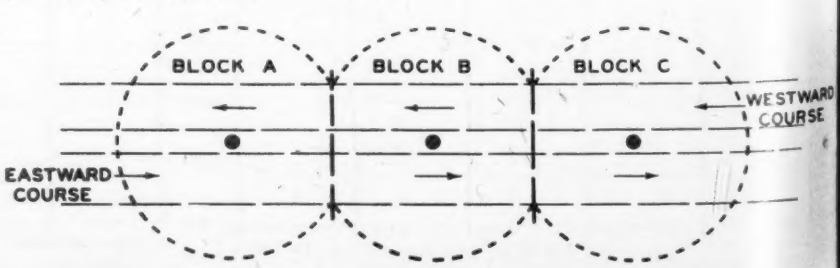


Fig. 8—Long and short pulse technics used in alternate blocks

Fig. 9—Multiple airways at the same elevation



BROAD BAND TUBE

Traveling wave design multiplies bandwidth by 80, gives tremendous gain

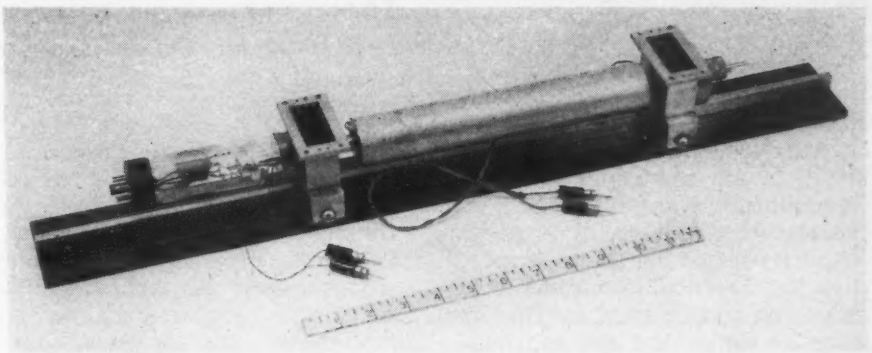


Fig. 2—Experimental model of beam traveling wave tube showing waveguide connections

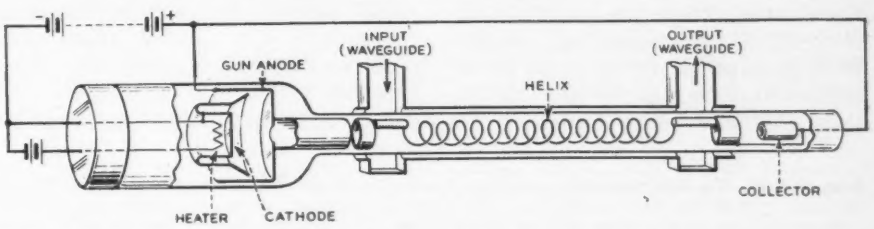


Fig. 1—Cross-section of the tube showing arrangement of the various elements

• The recent development by Bell Telephone Laboratories of the beam traveling-wave tube, described briefly in ELECTRONIC INDUSTRIES for August, promises to provide unprecedentedly high gain with a bandwidth about eighty times as great as has been practicable with other microwave tubes. Further, the nature of this new tube is such that the band can be broadened even more without sacrificing gain.

In the beam traveling-wave amplifier electrons are accelerated from a hot cathode by a high-voltage electrode and shoot down the axis of the tube in a narrow beam. No grids are used. Surrounding the electron beam for nearly a foot of its length down the tube there is a closely wound helix of wire which carries the signal current. This current produces alternating electric and magnetic fields or waves, and as the wire itself is roughly thirteen times as long as the wound spiral, the signal wave travels down the tube about one-thirteenth as fast as light. The electron stream travels through the helix a little faster than the wave.

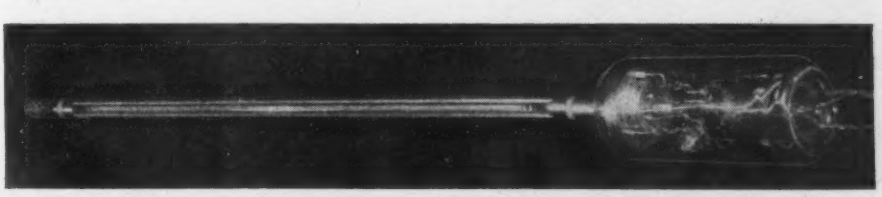
Since the signal wave at any instant is alternately positive and negative along the tube axis, electrons meet both retarding and accelerating forces in their progress down the tube. Due to the fact that the speed of the electrons is greater than that of the waves and due to the bunching of electrons caused by the waves there is a net positive transfer of energy from the electrons to the waves. Hence the wave amplitude is increased.

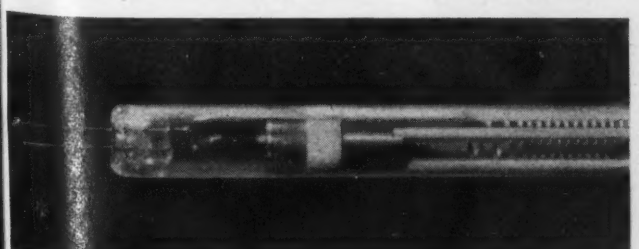
In the present amplifier two waveguides, one carrying the weak input signal and the other the amplified output signal, are fitted around the tube near the ends of the helix. At each end, the helix is fastened to a metal collar inside the tube, and short straight sections between the collars and the helix act as antennas to couple the helix to the guides. This arrangement is indicated diagrammatically in Fig. 1, while Fig. 2 shows a complete beam traveling-wave amplifier.

Besides the tube and the two waveguide connections, two coils which can be seen in Fig. 2 are required in forming the electron flow into a narrow beam and in guiding it down the tube. The electrodes surrounding the cathode are so shaped as to send the electrons into the tube in nearly parallel paths. The narrow coil just to the left of the input waveguide in Fig. 2 provides a final adjustment before the beam enters the helix, and the long coil covering the tube between the two waveguides keeps the beam from spreading in its passage through the helix.

The construction of the experimental tube can be seen more clearly in Fig. 3, which shows enlarged views of the two ends. Four slender ceramic rods which run the length of the tube between the helix and the inner surface of the glass hold the helix accurately cen-

(*Continued on page* 103)





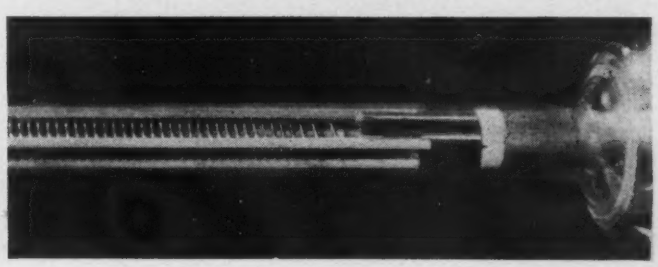


Fig. 3—Above, the complete tube; below, at each end the helix is attached to a projection from a metal ring that acts as an antenna. Input end at right and output at the left

RCA REVEALS FIRST

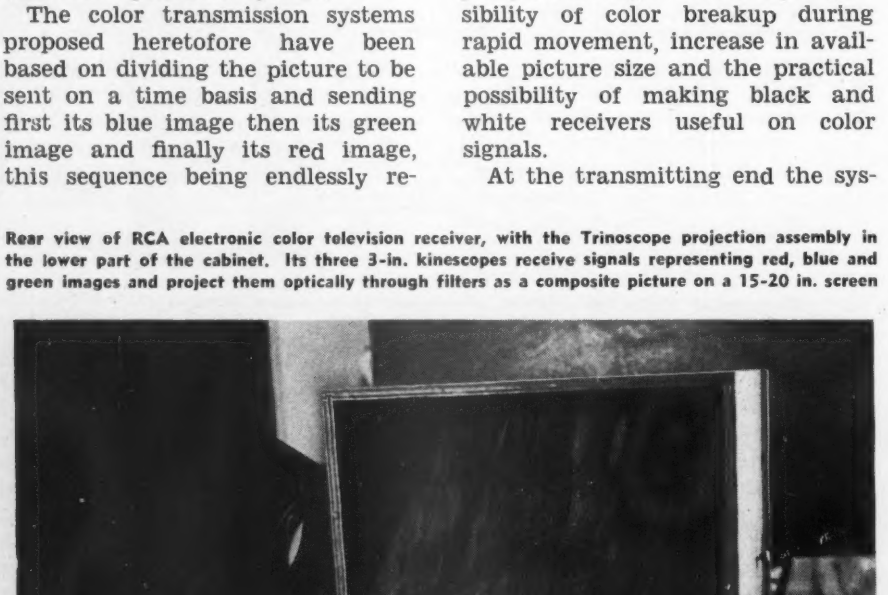
Three continuous color signals within 16 mc band are received on Trinoscope and projected into one picture

● At a demonstration on October 30, held for the benefit of press representatives and members of the broadcasting industry at Princeton Laboratories of the Radio Corporation of America, electronic color television was unwrapt for the first time as a practical system.

The color transmission systems proposed heretofore have been based on dividing the picture to be sent on a time basis and sending first its blue image then its green image and finally its red image, this sequence being endlessly repeated. In the Radio Corporation of America system all three colors are sent simultaneously and are therefore present all the time. A number of obvious advantages of this system can immediately be mentioned. Among them are tripling of the light available, impossibility of color breakup during rapid movement, increase in available picture size and the practical possibility of making black and white receivers useful on color signals.

At the transmitting end the system comprises an electronic cathode ray tube of about 5 in. face diameter as a light source. This is a tube with an aluminized phosphor face excited by 30 kv to give as much light as possible. A regular scanning raster is made to appear on the face. In front of this is placed the picture to be transmitted and beyond that there are focusing lenses with a system of partial color selective mirrors to split the light into three parts. The three light fractions, filtered by red, blue and green filters, respectively, are impressed on three phototubes thereby modulating AC carriers. The 3 modulated waves are then sent simultaneously side by side over a 16 mc bandwidth.

Rear view of RCA electronic color television receiver, with the Trinoscope projection assembly in the lower part of the cabinet. Its three 3-in. kinescopes receive signals representing red, blue and green images and project them optically through filters as a composite picture on a 15-20 in. screen



Color Separation

At the receiving end each of the three color modulations is used separately to excite a cathode ray tube of about 3½ in. face diameter. Light from these 3 tubes is focused again through the proper red, blue and green filters and condensing lenses onto a 15 x 20 in. translucent screen where the colored picture appears.

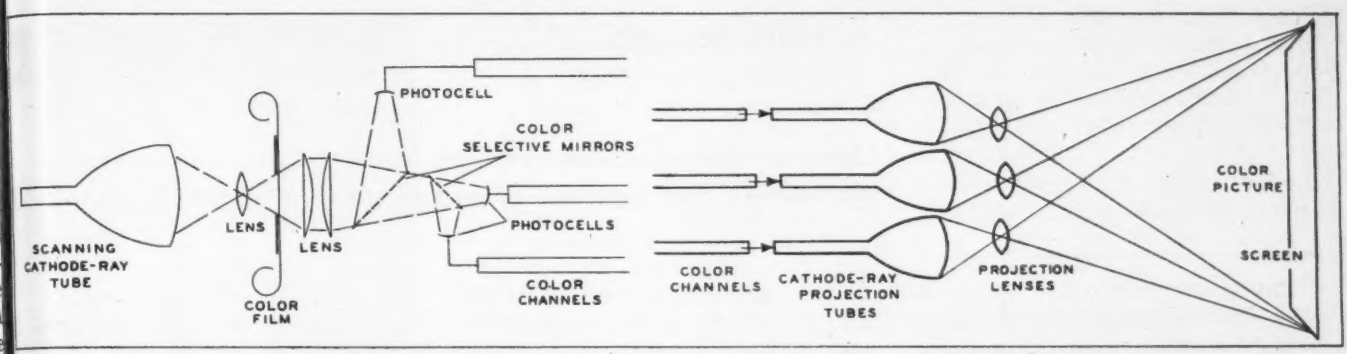
An ordinary black and white receiver can be tuned to receive the green image thereby rendering the picture in monochrome. This is possible inasmuch as the standard 525 lines, 30 frames per second scanning rate is used.

Due to the wide transmission band required it will be necessary to transmit in the 480 to 920 mc region and therefore a converter will have to be purchased by owners of black and white sets to bring this frequency down within the range of their tuning capabilities.

The picture resulting from this system is in excellent register and the color range is very wide. In the demonstration there was no color separation or fringing.

It was stated by Mr. E. W. Engstrom, director of research that the system had only just been finished and considerably more work would have to be done on obtaining better resolution and color balance.

ELECTRONIC COLOR TV



Manner in which the color picture is divided into three colors by means of color selective mirrors, transmitted on three carriers simultaneously and combined at the receiver for optical projection on the screen as a composite color picture. Tuning to green channel only will operate black and white set

However, he felt that there were no problems which could not be worked out in this system and that they were going ahead with its development in complete confidence that its possibilities were unlimited.

David Sarnoff, President of the Radio Corporation of America emphasized that the production of colored electronic television without mechanical rotating parts was as great an advance as was the cathode ray tube over the rotary scanning disc for black and white television. He felt therefore, he said, that the difference between mechanical rotating color television and electronic color television such as was demonstrated was the difference between there being no color television service and actual public color television.

After slides had been demonstrated, a colored moving picture, an old Disney film, was run through and gave excellent results. Here again C. B. Jolliffe, executive vice-president, and E. W. Engstrom, vice-president and director of research, emphasized that considerable more development work was in the immediate offing.

Mr. Sarnoff said that "The new RCA electronic color television system will be available to the entire radio industry. The development is so important in contributing to television leadership for our country that we have decided to demonstrate it publicly as apparatus becomes available for each successive step. We begin with the current demonstration in which still pictures are used, but which sufficiently establishes the basic principle; it will be followed by the transmission and reception of color pictures in motion, then outdoor scenes and finally electronic color television on large-size theatre screens."

Dr. Jolliffe disclosed that the RCA timetable for future demonstrations of color television is divided into five stages, the first of which featured still pictures televised from color slides on a large screen 15 x 20 in. The remaining

(*Continued on page* 103)

The electronic color television camera uses a high-voltage kinescope as a light source. Image of the slide in natural colors is separated into the electrical equivalent of component colors by means of a system of mirrors and photocells in the top unit of the assembly

BETTERING OUTPUT

By LOUIS DOLINKO
United Electronic Co., Newark, N. J.

Engineering considerations involved in improving performance through use of getter traps and graphite anodes

● The amount of power delivered by a transmitting tube for any class of service depends, in large measure, upon the ability of the anode to dissipate safely the heat created during operation. Recent war-inspired development of electronic equipment has prompted marked improvement in power tube operation, output and life. Much credit for this advance must be given to the use of graphite as an anode material. Previously established output and dissipation ratings have been increased by as much as 300%.

The relatively large mass of graphite anodes has offered problems in degasification and processing technics which were not present for metal anodes. Marked improvement in graphite anode transmitting tube performance and processing is a result of two fairly recent developments, the "isolated getter trap" and zirconium coating of the anode.

The isolated getter trap (patent pending) consists, in its conventional form, of a glass tube ⅞ in. long and approximately ⅜ in. in diameter into which the molybdenum flag with attached getter cup is introduced. Each end of the flag is welded to a nickel shield and the shields fit snugly over the ends of the glass tube. Each shield has a single vent and the molybdenum flag is placed so that the getter material faces in a direction opposite to the vents. (See Fig. 1)

The advantages of the getter trap are:

1. Radio frequency losses resulting from conductive getter deposit on the bulb are reduced to a minimum. Hence, increases in tube power output and efficiency result. Furthermore, local overheating of the glass bulb and stem which may lead to bulb puncture and stem-press electrolysis is, in the main, avoided.

2. Decreased values of inter-electrode capacitances result from the absence of a conductive getter deposit on the bulb. This permits use of full tube ratings at higher frequencies or alternately allows increased ratings for a given operating frequency.

3. More stable interelectrode capacitance values are attained. In conventional transmitting tubes the amount of conductive getter deposit on the bulb varies with tube operating temperature and affects the values of the inter-electrode capacitances. The use of the getter trap leads to increased stability of these capacitances which in turn furthers frequency stability and great constancy of tube characteristics.

4. The non-contamination of internal tube parts leads to a decrease in primary emission from active getter particles deposited on the plate and grid; also a decrease in secondary emission, which may be caused by the pollution of the plate and grid surfaces.

5. High-frequency flashing of the getter material may be controlled by visual examination of the amount of getter in the trap and by attendant heat adjustment.

The new getter structure has yielded interesting results as regards (a) increased power output for specific operating conditions; and (b) greater uniformity of power output for production runs.

Tubes with the new getter structure were compared with others of conventional getter structure with the following results:

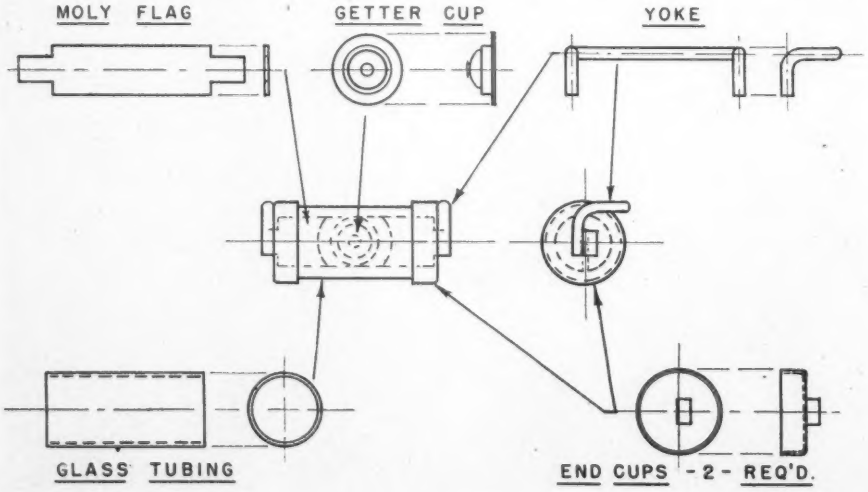
	With Getter Trap	With Conventional Structure	Gain
Average Antenna Power Output	270 Watts	255 Watts	5.9%
Percent Deviation from Mean	.27%	1.70%	1.43%

Operating Conditions—Tube Type HV-18: E_f = 10 Vdc; E_p = 2000 Vdc; I_p = 200 ma; I_g = 25 ma; F = 15 mc.

With a rise in operating frequency the difference between the old and new structures becomes more marked. For this particular tube type, at an operating frequency of 30 mc, gains of 20% in power output are usual.

HV-18 tubes with both old and new getter structures were life tested at 800 watts input—a very high rating for this type. Tubes with the old getter structure exhibited life of a few minutes before collapsed bulbs and other defects appeared. Tubes with the new structure gave satisfactory life through a continued test of 500 hours' duration.

Fig. 1—Construction of the getter trap in which getter material faces in direction opposite vent



FROM POWER TUBES

General appearance of tube showing location of the getter trap and its method of mounting

Heretofore it has not been practical to use a graphite anode in very high frequency transmitting tubes because of the nature of conventional getter assemblies which tend to waste radio frequency power in the metallic getter deposit. The isolated getter trap, however, eliminates this disadvantage and allows the use of graphite anodes in these tubes.

Anode materials

Anode materials for high quality tubes must meet stringent requirements. The choice of such material is, in general, dictated by the following criteria:

1. The material must permit ready and thorough degasification procedures.
2. Low coefficients of thermal expansion are essential for maintenance of shape, uniformity of characteristics, and constancy of interelectrode capacitances. The expansion of the material must be free from discontinuities or structural transformations which may cause warping.
3. Thermal conductivity must be high in order that hot spots and back emissions be avoided.
4. High radiation emissivity is needed so that sufficient heat is radiated to keep the anode temperature low.
5. The vapor pressure at the outgassing temperature should be sufficiently low to prevent deposition upon the bulb and associated tube parts.
6. The material must permit manufacture to close dimensional tolerances and must be sufficiently strong to withstand processing and handling during assembly. The strength at high temperatures should suffice to maintain alignment and prevent deformation during processing and use.

The considerations enumerated above are an integral part of the tube design and performance. Graphite, as a power tube anode material, may now be evaluated in terms of these considerations.

Thermal expansion

During the exhaust of power tubes, vacuum tube generators are used to heat anodes considerably above normal operating temperatures — occluded gases are thus driven from the various tube parts. At these high temperatures, a low coefficient of linear expansion is of prime importance if warping of the anode material is to be prevented. Such warping, of course, may also occur if the power tube is overloaded during operation.

Warping changes the relative positions of the electrodes, thus affecting the tube operating characteristics, the interelectrode capacitances, and indirectly, the operating frequency.

Graphite has a lower linear coefficient of expansion (see Table 1) than any other power tube anode material and since no softening point for graphite exists, these anodes will not warp. Also since graphite does not melt or flow, fused spots or holes in the anode are avoided. This freedom from mechanical displacement of tube elements allows the manufacture of closely matched tubes.

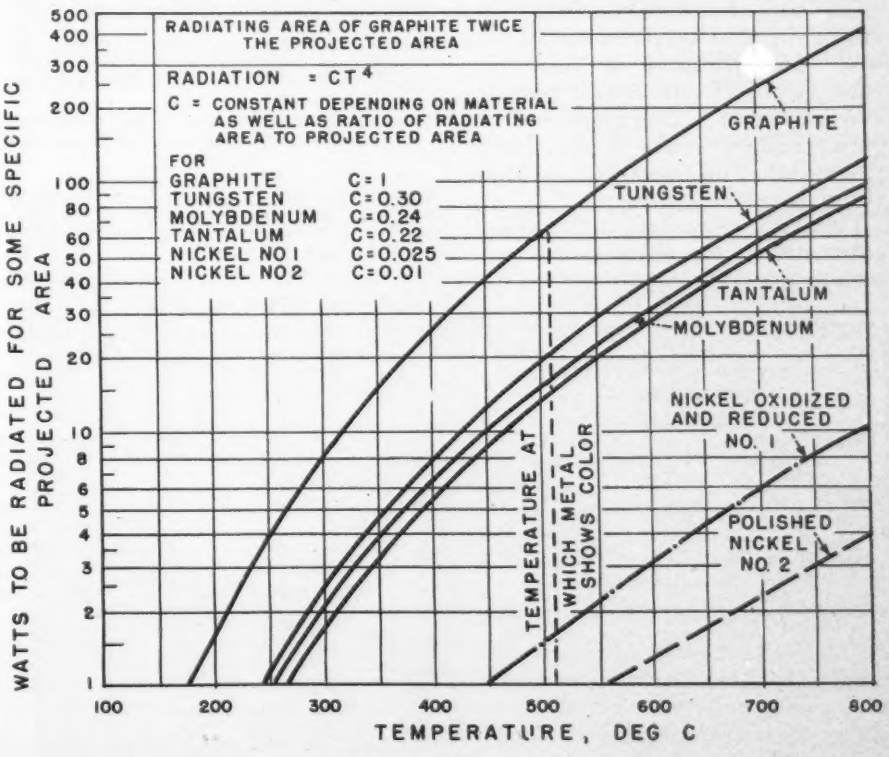
TABLE 1
LINEAR COEFFICIENTS OF EXPANSION

Graphite	2-2.8 x 10^{-6} per °C.
Molybdenum	4.0 x 10^{-6} per °C.
Tantalum	7.0 x 10^{-6} per °C.

Radiation emissivity

As previously stated, the power-handling ability of an electronic tube is a function of the heat dissipated during operation. High heat radiation is perhaps one of

Fig. 2—Heat dissipating properties of graphite as compared with a number of other materials



the most critical requirements of an anode material. Fig. 2 depicts the heat dissipating abilities of some anode materials. At 510°C., the temperature at which these anodes begin to show a red color, a graphite anode would dissipate 70 watts as compared to 16 watts for molybdenum, and 14 watts for tantalum. At 600°C., a graphite anode would dissipate 130 watts as compared to 31 watts for molybdenum and 28 watts for tantalum.

Hence, to get dissipation values which are sufficiently high, molybdenum and tantalum anodes must operate at higher temperatures than graphite. Even at 800°C., molybdenum would only dissipate 98 watts and tantalum 90 watts for the specific projected area under consideration.

A low vapor pressure in an anode material is extremely desirable in order to reduce deposit of conductive coating on the bulb and insulators during exhausting as well as in normal operation. The vapor pressure of graphite is $360 \times 10^{+12}$ mm of mercury at 1000°C. This is an average value which varies with different types of graphite. It lies between the vapor pressure values of tungsten and molybdenum and is comparable to the vapor pressure of tantalum.

Thermal conductivity

The high thermal conductivity of graphite coupled with its relatively large mass insures quick and uniform distribution of heat through the anode. Hence, hot spots and resultant warping and fusing of the anode material, as well as overheating of associated tube parts with consequent gassing, are prevented. The greater mass of a graphite anode is also effective in allowing the anode to withstand severe overloads.

Comparative values of thermal conductivity for some anode materials are given below:

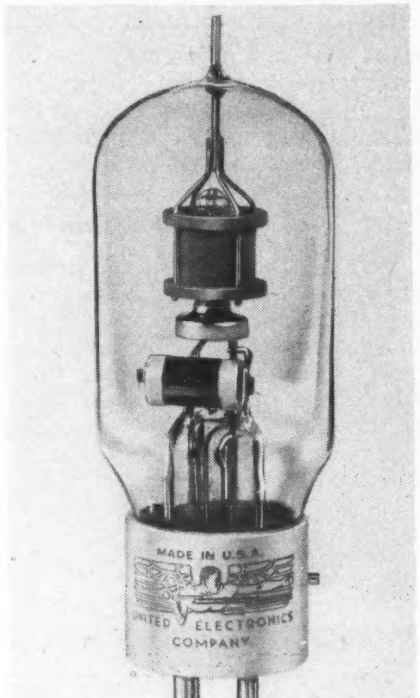
TABLE 2
THERMAL CONDUCTIVITY
(CAL/CM SEC °C)

Graphite (solid)	.315 at 20° C. .337 at 390° C. .286 at 20-1000° C.
Molybdenum	.35 at 20° C. .236 at 1000° C.
Tantalum	.130 at 20° C. .174 at 1430° C. .186 at 1630° C.

Ease and efficiency of anode outgassing is of extreme importance. The anode must not liberate any appreciable amount of gas during normal operation. Gas in a tube leads to ionization (evidenced by a bluish-purple or pink glow), lowered negative space charge, increased anode current, higher anode temperature, and finally, liberation of still more gas. The emission obtainable from thoriated tungsten filaments is readily poisoned by small amounts of oxygen and by the sputtering or bombarding action of positive ions. This is especially true of the heavier gases, such as mercury, which will destroy emission much more readily than the lighter gases such as hydrogen.

TABLE 3

	Graphite	Molybdenum	Tantalum
Melting Point (°C.)	3674 (sublimes)	2620	2850
Tube Processing Temperature (°C.)	(pre-heated 1600-2100) 1000-1200	1500-1700	2000
Normal Operating Temperature (°C.)	500-600	700	800-900



Another type of graphite anode construction such as is used in tubes for high frequencies

In connection with tube degasification, three temperature levels are involved, namely, the melting point, processing temperature, and operating temperature. Adequate temperature differentials must exist between these levels if high power rating and safe tube operation is to be attained.

Graphite, when degassed at 2150° C., will yield no further gases even if subsequently heated to a higher temperature. It is interesting to note that a graphite anode that has been completely degassed will absorb only a small fraction of the original gas content when stored under proper conditions. It has been found that no gas is evolved by graphite at 1000° C. if it has been previously degassed at 1300° C.

Norton and Marshall[5] studied evolution of gases from a sample of carbon which had been hydrogen fired and then vacuum fired. It was found that the gas evolved in the range 1700° to 2200° C. was predominantly nitrogen, while at lower temperaatures, hydrogen and carbon monoxide were the chief gases given off.

Outgassing methods

Graphite anodes are often hydrogen baked at 1000° C. or above in order to accelerate the subsequent outgassing procedure and to prevent oxidation during the exhaust process. The large volume and porosity of graphite indicates that more gas must be removed from it than from molybdenum or tantalum.

It is interesting to note, however, that exhaust schedules and times for both graphite and molybdenum are quite similar. Dur-

(*Continued on page* 104)

Life tests indicate that graphite anodes become harder during operation

TYPE: V-70-D No. CB-7	Test Readings After Total Hours Indicated										
Hours	0	16	32	77	134	179	242	338	385	403	573
Emission Voltage	6.7	6.7	6.6	6.6	6.6	6.5	6.5	6.6	6.6	6.6	6.6
Gas Current (Microamperes)	1.4	1.1	0.6	0.6	0.3	0.3	0.4	0.4	0.4	0.4	0.4

Conditions of Operation

Frequency—10 mc
Plate Voltage—1750 Vdc
Plate Current—175 ma per tube
Grid Current—25 ma, dc, per tube

Push-Pull Oscillator
Input per Tube—306 watts
Power Output—226 watts
Plate Dissipation—80 watts

ENGINEERS STUDY TV

New transmitters, studio equipment and receivers feature record attendance at second TBA conference

• Keyed to the slogan "Television —It's Here", Television Broadcasters Association, Inc., wound up its second annual conference and exhibition after two days at the Waldorf-Astoria in New York on October 11 with a record registration of about 800, which is a couple of hundred more than registered for the first conference held in December 1941. Over 1200 attended the annual banquet and heard Paul Raibourn, vice-president of Paramount Pictures, Inc., present TBA's Awards of Merit for engineering achievements and programming progress. Before and after the dinner, delegates and guests packed the exhibition where the wares of an even dozen exhibitors were spread out.

For the most part the conference devoted itself to programming, which is understandable when it is considered that TBA, formed in December 1943 with ten charter members now has close to fifty film companies, advertising agencies, manufacturers, educators and a dozen major broadcasters on its membership roster. Ralph B. Austrian was general chairman of the conference.

From an engineering point of view, interest centered largely in the exhibition, which uncovered some new equipment for transmission, for studio control, for remote operation and for better use of film. In addition there were several newly developed home television receivers though none disclosed the use of anything radically new in the way of circuit design or the utilization of components.

For the better use of film, RCA's Victor Division had on hand a special television film camera and a 16 mm television film projector; General Electric had in operation its new pulsed-light movie projector which will be available for both 16 and 35 mm film.

Precise electronic timing of illumination and camera tube scanning of movie film frames is a feature of the GE projector, which requires no shutter. A capillary tube mercury lamp (GE # AH-6) delivers light pulses that are controlled by signals from the television station's synchronizing pulse generator thus being timed with the sweeps of the television camera tube. The pictures are projected onto the mosaic during the blanking intervals.

The capillary lamp is operated at about 10 amperes during each pulse of operation (500 microseconds every 1/60 second). The lamp, an optical system consisting of reflector and condensing lens which direct the light through the film, and an electronic pulse generator are packaged together and mounted on a standard projector pedestal in place of the conventional arc lamp or other light source.

Eliminating the shutter, GE's pulsed light film projector is electronically synchronized

The rest of the mechanism is similar to that used in present-day television movie projectors, except for the elimination of shutters and associated gearing, shafts and guards. Strict requirements of motor phasing ordinarily encountered in television movie projection are materially relaxed because the illumination of the film is not governed by a mechanical shutter which must be carefully aligned with the scanning circuits of the television system.

In network operations, the new GE projector will allow comprehensive switching without difficulty. Wide tolerance on phase of the film-drive mechanism will permit simple methods to be used for making the projector follow the station synchronizing. It will not be necessary to dictate the phase and frequency of the synchronizing signals

Top engineering award of TBA was given to these three engineers who together fathered the Image orthicon tube. They are Dr. Albert Rose, Dr. Paul K. Weimer and Dr. Harold B. Law, of RCA Labs

which govern the whole television system.

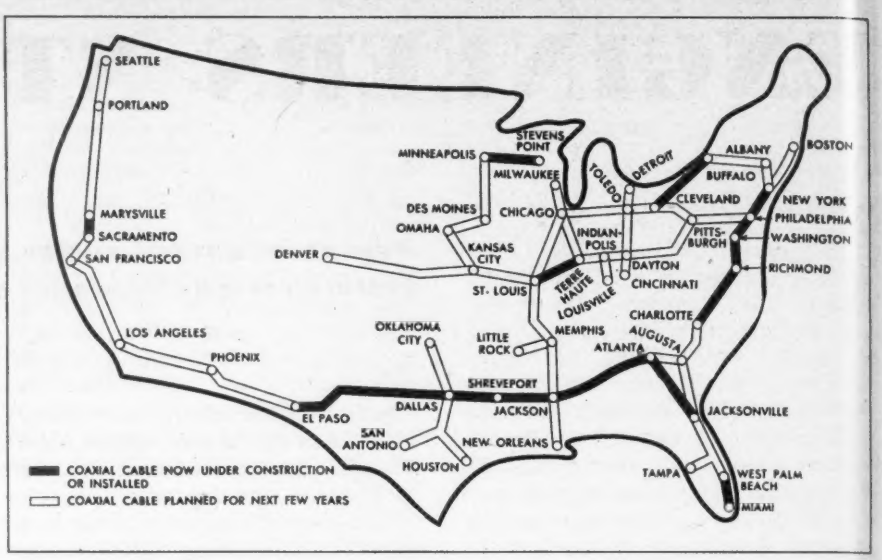
In addition to its new film camera and projector, RCA also had in operation production models of their Image-orthicon television camera and associated portable control and monitoring equipment. Also shown and demonstrated, in addition to the various components of the field camera sets were RCA's new monoscope camera, used for introducing titles and other still pictures into regular field pickup transmissions as well as for testing equipment in telecasting studios and television receiver manufacturing plants, and RCA microwave radio relay equipment. The latter, consisting in the main of a hook-shaped waveguide backed by a parabolic reflector, is used to beam a program from field location-to-studio or studio-to-transmitter.

Two other new RCA products were the special television film camera and the 16 mm television film projector. The camera, which contains an iconoscope and associated circuits, provides a means of obtaining picture signals from either 16 mm or 35 mm positive or negative motion picture film. The projector is designed to throw images from 16 mm film on the mosaic of the iconoscope at the rate required to match current television scanning standards, and can accommodate up to 2000 feet of film without replacing reels.

Demountable camera

The new RCA Image-orthicon camera is arranged to be demounted and set up again for movement to and from a field location. The body of the camera consists of two units, the lower unit housing the Image orthicon pickup tube and video amplifier circuits and controls, while the upper unit houses an electronic view finder which enables the operator to see on a small kinescope the exact picture he is picking up and transmitting. The two units fit together when set up for operation.

The camera has a four-position lens turret which will accommodate any standard lenses and permit almost instantaneous change. The lens turret control on the back of the camera permits the operator to change from one lens to another of a different focal length and refocus in less than one second. A specially designed lightweight telephoto lens also can be fitted into the lens turret when it is desirable to locate the camera at some distance from the action.



Bringing television network shows nearer, AT&T is rapidly expanding its coaxial cable facilities

RCA receivers demonstrated included seven and 10-in. direct view television sight and sound table models, showing pictures 23 and 52 sq. in. in size respectively; a console with a 10-in. direct-view television receiver, standard broadcast, FM and shortwave radio plus Victrola with automatic record changer; a large-screen projection model television console showing a 15 x 20 in. picture in combination with standard broadcast, FM and shortwave radio.

The 10-in. table model will be the first of the RCA Victor television receivers offered the public. It goes on public sale in selected stores in commercial television markets in November.

DuMont, in addition to a complete television studio set-up including two cameras and all necessary monitoring and measuring equipment, also staged an extensive exhibit of receivers ranging from large console models built around the company's 20 in. direct view tube, to several smaller models in which 12 and 15 in. tubes are used. All DuMont receivers, it is understood, are to match a 75-ohm input so as to allow the use of coaxial cable feeder and a new type of antenna engineered especially for the purpose by Dielectric Products, Inc., Jersey City. The antenna itself was illustrated and described on page 96 in the November issue of Electronic Industries.

GE's new TV camera and one-man hydraulically operated dolly is lighter, more flexible in use

Inductive tuning

DuMont also exhibited working models of its Inputuner, embodying the Mallory-Ware inductuner covering all channels in both FM and television bands from 44 to 216 mc. Tuning is continuous, without the need for any form of switching.

Farnsworth Television and Radio Corp., during the past year has developed a new line of home receivers ranging from table models to television-phonograph-radio combinations, and development work is now being carried forward on a projection-type console. In addition, transmitting and studio equipment are slated for early production. Included in the exhibit were these models: a metal cabinet table set with a 10-in. semi-flat viewing tube, covering all channels and with provision for later addition of an AM adaptor for standard broadcast; a wood cabinet table model quite similar to the other, both to sell for between $250 and $300; a direct-view console which incorporates standard broadcast and has a 10-in. tube; a low-boy combination console with standard broadcast and a record changer; a deluxe console

(*Continued on page* 110)

Combining flame heating and HF current in the fabrication of glass pipeline and heat exchanger, a section of which is shown in the background

HF GLASS WORKING

By E. M. GUYER,
Research Laboratories
Corning Glass Works, Corning, N. Y.

Electronic heating alone and in combination with flame simplify production and extend conventional limitations

• The glass maker has recourse to a new art of electrical glass working which transcends, in many important ways, the limitations of the older flame art. These novel electrical methods are the result of several years of experiment in the research laboratories of the Corning Glass Works over wide frequency bands with different types of electrical power sources and control equipment.*

Glass, with proper handling, can be welded with electric currents or heated and melted in high frequency electric fields with many of the benefits and advantages which these new electronic tools are demonstrating in the metal and plastic industries.

An outstanding example is afforded by current demands for giant television tubes. The glass eyes of television have grown, recently, so big as to tax the art of the glass maker. With tube diameters measured in feet instead of inches, superior optical quality has been achieved by pressing the large funnels and viewing panels separately and then sealing them together to form a vacuum tight envelope. The sealing operation must be accomplished without distortion of the glass parts or loss of accurately controlled dimensions.

At the present time this operation is being performed successfully by means of the newly developed electrical methods which not only provide distortionless welding together of the parts but permit the high melting temperature low expansion borosilicate glasses to be worked even more easily than soft glasses can be worked with conventional gas burners.

To see clearly just why these electrical heating methods are desirable, how they operate and what advantages they possess over flame heating in the sealing of television tubes and many other glass products we must first consider three different types of electrical heating.

In electrical glassworking the

*U. S. Patents 2,306,054, 2,389,360, 2,394,051.

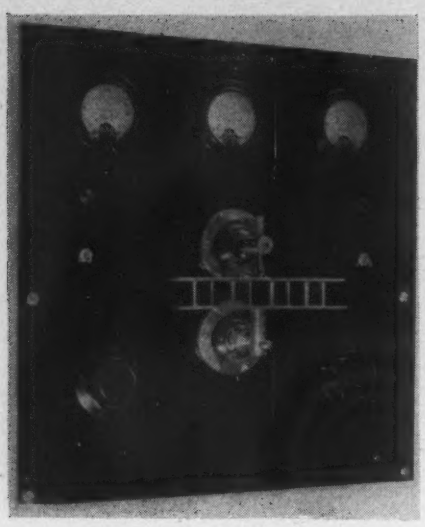


Fig. 1—Condenser electrode system for HF dielectric loss heating of industrial glass

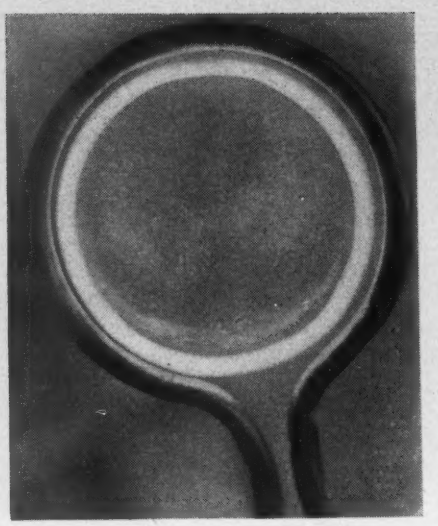


Fig. 2—Showing use of encircling electrode in glass fabrication by HF induction method

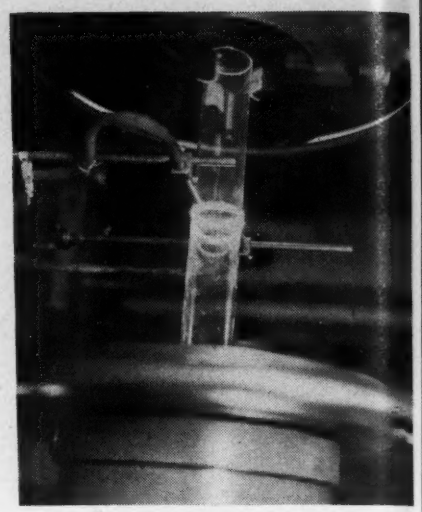


Fig. 3—Use of a high frequency glass sealing lathe utilizing an electrode cross-fire

glass is heated by transformation of electrical energy into heat within the glass. Electrical energy is transmitted into the glass by one or more of the three basic methods—high frequency dielectric loss heating, high frequency induction heating, and electrical conduction heating.

Selection of a particular type or combination of the basic types is governed by the range of temperature required, the shape of the article and kind of glass to be heated, and by the exact nature of the operation to be performed.

Since glass at low temperatures is a dielectric it can be heated by high frequency dielectric loss heating up to temperatures where its electrical resistivity is too low for efficient matching to high impedance wave generators (Fig. 1). Once the glass has become a high resistance electrical conductor, however, it generally is more efficient to switch to electric conduction heating to attain the much higher temperatures necessary for melting. Here again, however, the resistance variation calls for special treatment of the power supply system to maintain efficient operation and close control of heating rate. When its resistance is finally low enough, the glass can be rapidly heated and melted by high frequency induction like any other electrical conductor. (Fig. 2.)

Another system of electrical glassworking which has proved very effective in certain applications operates by means of a so-called electrical-cross-fire (Fig. 3). No condenser plates are necessary with this system since the electrodes consist of electrically conducting pin points of flame. These little flames serve a threefold purpose:

1. They preheat a restricted region of the glass until it becomes electrically conducting although still far below glassworking temperature.

2. They accurately guide the high frequency electrical discharge from the burner tip to the preheated conducting path on the glass thus serving as flexible nonsticking brushes or power leads.

3. Their proximity to the glass determines to a certain degree the load resistance since they are connected in series and thus motion to or from the glass serves as a rheostat regulating current flow and hence heating rate. As they impinge on the glass surface even

Fig. 5—Glassware ranging from 25 lb. lightning arrestors and heat resistant glass fuse bushings to miniature glass cells all produced by electrical sealing

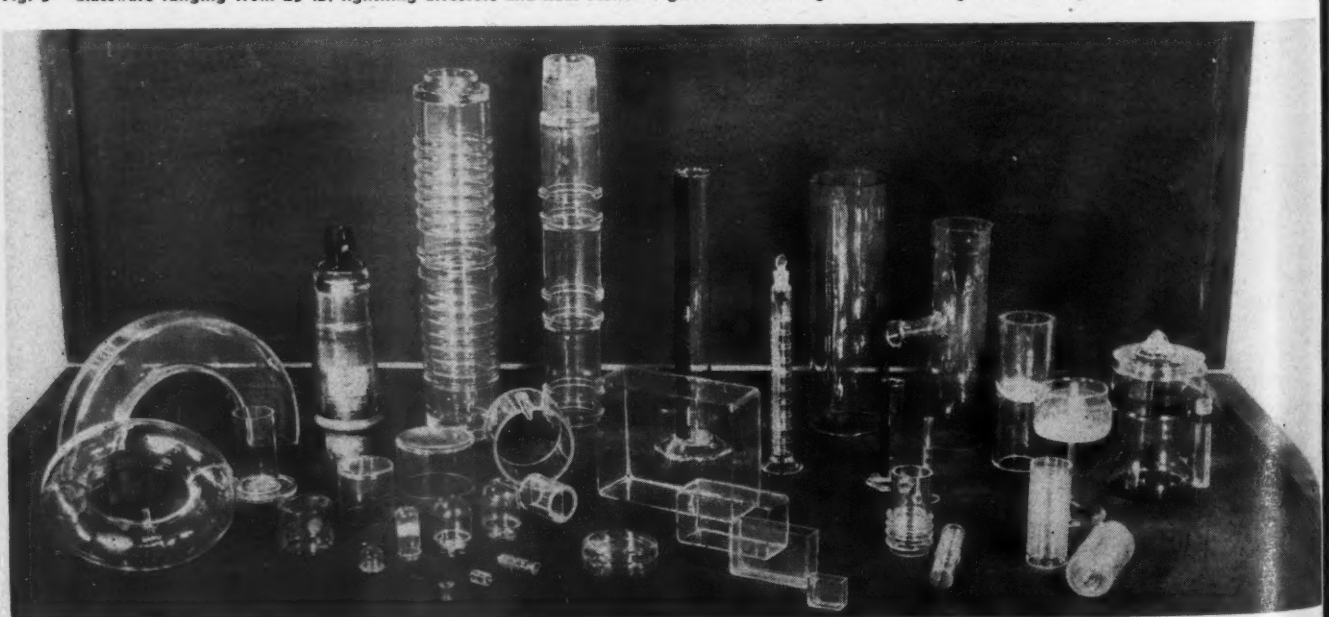


Fig. 4—Glass coil forms for radio use showing locations of ten electrically punched holes

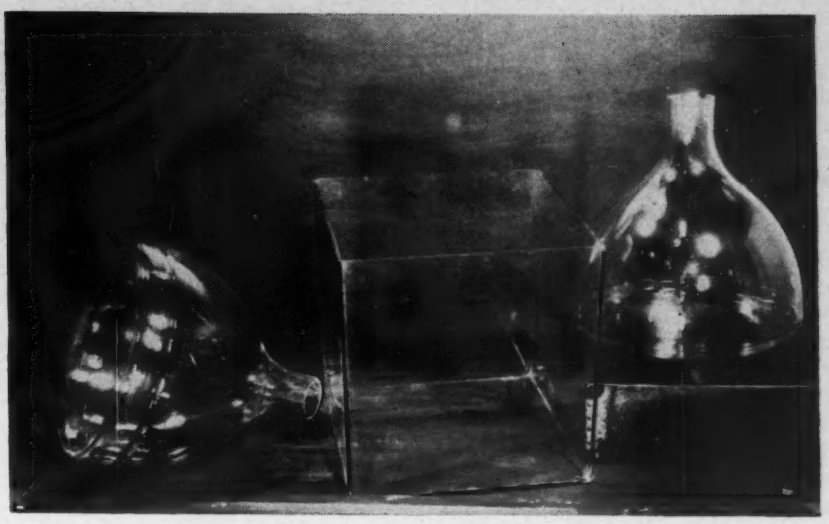


Fig. 6—Two examples of large glass products that have been fabricated with HF heating equipment—a large square glass box and two modern type 20-inch face television tubes

their resistance losses contribute to glass heating.

Once electrical conduction has been established through the glass the operator has at his disposal exact electronic control of the heating rate by virtue of variable oscillator and impedance matching network parameters of the HF power supply.

Among many possible applications of electrical glassworking under investigation at Corning two distinct types of operation have already graduated from the experimental laboratory and are now established in actual production practice — high frequency hole punching and high frequency electric glass welding.

Because of its rapid rate of increase in viscosity as it starts to cool, glass—even very hot glass—is hard to perforate. The same properties which permit glass to be drawn into rods and tubes hundreds of feet in length manifest themselves when an attempt is made to poke a hole through a body of hot glass. By heating a molten path through the glass with high frequency current, however, a smooth surfaced hole can be formed more easily and in much less time than by conventional grinding operations. A machine tool not unlike a giant ticket punch is used to pierce the fluid glass in the highly localized electrical melting zone.

Fig. 4 illustrates a recent development in electronic glassware made possible by the new process. The low dielectric losses of these two different types of glass coil forms enable them to meet the exacting requirements of stable high Q inductor service in the ultra-high-frequency wavebands. Ten electrically punched holes locate mounting screws and anchor winding terminals in one type while a ¾ in. diameter hole punched in the end of the other facilitates mounting.

Electrical glassworking

High frequency electrical glass welding has been in actual production operation for a period of five years with several of the original machines still turning out ware twenty-four hours a day. These products include articles formerly manufactured by conventional methods and new glass products developed with the aid of the electrical methods. All of these would be more difficult and costly, or, in some cases, impossible to produce without electric heating.

The varied glassware illustrated in Fig. 5 ranging from 25 lb. lightning arrestors and heat resistant glass fuse bushings to miniature glass cells was all of it produced on either hand operated electrical sealing lathes or on rotary automatic machines. In Fig. 6 the large glass box and 20-in. diameter television tubes are likewise products of electrical sealing.

In certain operations electrical methods actually eliminate the necessity of using costly machines in welding operations. Accurately synchronized rotary leads sometimes can be replaced by relatively simple and inexpensive jigs and fixtures to support the glass parts.

A striking example of this process is the high-frequency-wave welded "all-glass" pipeline, a new product of electrical glassworking. Simple portable equipment makes possible for the first time the rapid installation, repair and servicing of "all-glass" lines of any length desired in plant or out-of-door locations.

Although the new electrical methods can be applied wherever conventional gas operations are now used, the cost of high frequency equipment necessitates intelligent selection of work where optimum benefits are derived from the special features of the electronic process.

Some of the advantages of electrical glassworking demonstrated by laboratory experiment and production practice may be summarized briefly as follows:

1. Electrical glassworking transcends the limitations of conventional methods with regard to size and shape and composition. Work is not restricted to articles in forms which can be mounted conveniently on rotating heads. Neither is it limited to glasses with low melting temperatures.

2. Electrical seals are stronger due to favorable temperature distribution.

3. Rejection losses are reduced by more accurate control of temperature and exact repetition of critical processes.

4. Sharp localization of heat prevents overheating of other parts in close proximity to the melting zone.

5. Electrical methods are free from injurious loss of volatile glass constituents and deleterious reactions with products of combustion.

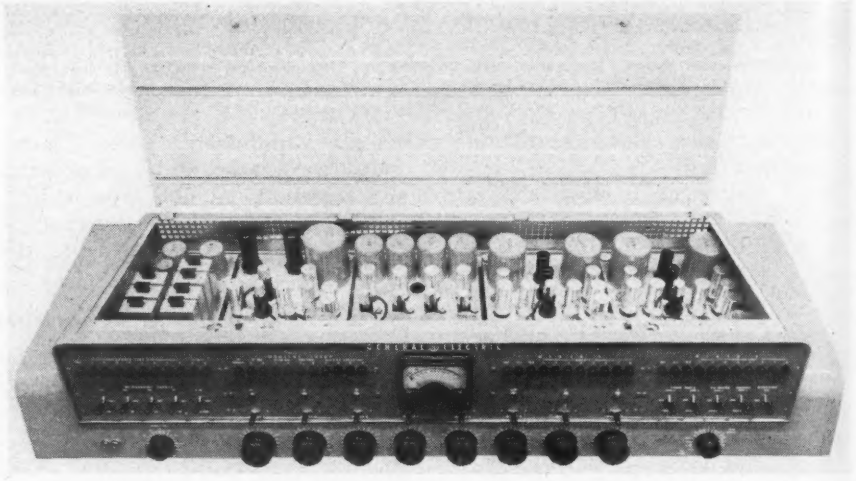
6. Electric heating provides deep penetration into thick sections of hard glasses, resulting in faster melting speeds.

Thus in operations where heating and melting time are significant factors, production costs can be cut by the adoption of electrical glassworking methods.

STUDIO CONTROL UNIT

By N. J. PETERSON
Transmitter Division
General Electric Co., Syracuse, N. Y.

Single cabinet for desk mounting contains all controls and amplifiers for one or two studios and announce booth



The consolette has been engineered and built for maximum accessibility. Hinged top cover raised

• With the present rapid expansion of the broadcasting industry, and with new FCC engineering standards for FM, there is a need for new high quality equipment in broadcast studios. The consolette, type BC-L-A, will be the answer to most requirements for a studio control unit for both AM and FM broadcasting.

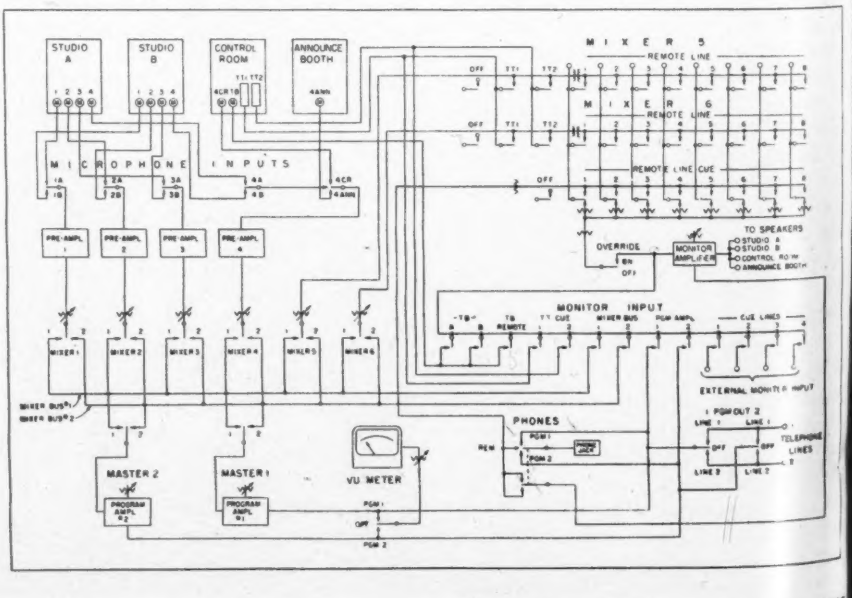
The single cabinet, for mounting on a standard desk, contains all of the controls and amplifiers needed for operation of either one or two studios plus an announce or transcription booth. Facilities are included for monitoring, cueing, and "talkback," in addition to the main functions of controlling microphones, transcription turntables, and remote lines.

The simplified block diagram shows how the various components are connected to make a complete audio system. By the use of switches in the preamplifier input circuits, four microphones can be accommodated in each studio. The input to one of the preamplifiers also can be switched to either an announce booth or a control room microphone.

The preamplifier outputs are connected to four of the mixers, mixers 5 and 6 being used for transcription turntable and remote line inputs. A push-button assembly is used for selection of inputs to mixers 5 and 6, which can be any one of the two turntables or eight remote line circuits. The push-buttons are mechanically interlocked so that only one button can be used at a time. The six mixers can be switched to either of two mixer buses, and by the use of input switches on the two program amplifiers, it is possible to select either mixer bus for either program channel.

The use of two program channels means that in case of an emergency, the program can be switched instantly to the second channel without loss of program time. Or, if desired, the program can be fed into two transmitters (perhaps FM and AM), with complete isolation furnished by the separate program amplifiers. At other times, the No. 2 channel can be used for auditioning while No. 1 channel is "on the air." In special cases, where several microphones are being used, both channels can be connected to the same outgoing line, without mismatch, and one of the master gain controls can be used for fading three orchestra microphones simultaneously while an announcement is made on a microphone controlled by the other master gain. This is done without affecting the mixer settings.

Simplified block diagram showing how components are connected to make complete audio system



The front panel, which is sloped to give best visibility, contains the gain controls, switches, and visual monitor (VU meter). The placement of these parts has been given particular attention to provide operating ease. A new improved type of push-button switch is used for high level audio switching and standard lever keys for low-level and output switching. The VU meter, which is illuminated, has an external multiplier which can set the 100% point on the scale for +4, +8, +12, or +16 VU. A switch on the panel transfers the VU meter to either of the line outputs.

Approximate audio levels in the consolette for normal operation are shown on the chart. Before entering the mixers, the microphone level is raised 30 db. by the preamplifiers. Then, in order to compensate for the mixer loss of approximately 26 db., a booster stage is used in the program amplifier, ahead of the master gain control. This arrangement gives desired operating flexibility with optimum performance characteristics.

The master gain controls of the program channels are placed between the first (booster) and second stage of the program amplifier. For normal operating conditions, the master gain is set so that the program amplifier, including the booster stage, increases the mixer bus level by approximately 70 db. This results in an output of +8 VU, (including loss of 6 db. output pad) which is the normal level for feeding telephone lines. At this output level, the distortion is less than 1% rms, 50 to 15,000 cycles.

Transcription turntables are connected directly to the mixer buses in the consolette. In order to obtain the proper level from most transcription pickups, it is necessary to use an external preamplifier having at least 30 db. gain. Quite often, this amplifier is located in the turntable cabinet. Remote line imputs have built-in isolation transformers and the remote line level is decreased with 29 db. pads, before connection is made to the mixer bus.

Frequency response

The most critical parts of the amplifier circuits are the audio transformers. In order to obtain low distortion and uniform frequency response from 50 to 15,000 cycles, it was necessary for the transformer designers to work very closely with circuit designers in order to develop the special transformers required. Special alloy shields and windings are used to obtain the low noise levels required. Amplifiers have been designed so that overloads do not occur during conditions of unusually high microphone output levels. Low noise level tubes, such as the type 1620, are used for highest performance.

The 10-watt monitoring amplifier will operate four loudspeakers and has sufficient gain so that the talkback microphone, which operates through the monitoring amplifier, does not require a preamplifier. The volume control for this amplifier is mounted on the panel. Usually, an exceptionally high quality monitoring loudspeaker is located in the control room for accurate aural monitoring and wall speakers are used in the studios.

If additional loudspeakers are required for sponsor booths, reception foyer, and offices, it is necessary to have additional monitoring amplifiers. The headphone jack, which is on the panel, can be switched to either line output or to the incoming remote lines. This jack accommodates either single or double plugs.

Cueing operations are handled with push-button switches which connect the input and output of the monitoring amplifier to the desired circuits. Any of the remote lines can be cued by selecting the proper push-button. The input of the monitoring amplifier can be switched to the outgoing program channels, mixer buses, transcription turntables, or several external cue inputs. The external cue could be from master control, station monitor, or other special sources. An over-ride switch makes it possible for a remote operator to "call-in" on the monitoring loudspeaker in the control room for tests before a broadcast. This eliminates the need for a special order-wire.

All microphones and loudspeakers are interlocked so that acoustic feedback will not occur at any time. For example, when the operator wishes to talk into studio "A" he simply presses the button marked "TALKBACK A." This automatically disconnects the control room loudspeaker and prevents feedback. The circuit is arranged so that it is not possible to talk back to a studio which is on the air.

The power supply for the consolette is a separate wall-mounted unit. This unit contains four rectifier circuits—individual rectifiers for each of the two program amplifiers, the monitoring amplifier, and the relay circuits. Preamplifier power is obtained from either of the program amplifier power supplies. This arrangement provides maximum reliability. The relay rectifier will furnish power to operate external "on-air" and audition light relays. These relays are controlled by circuits in the consolette.

Installation of the equipment is

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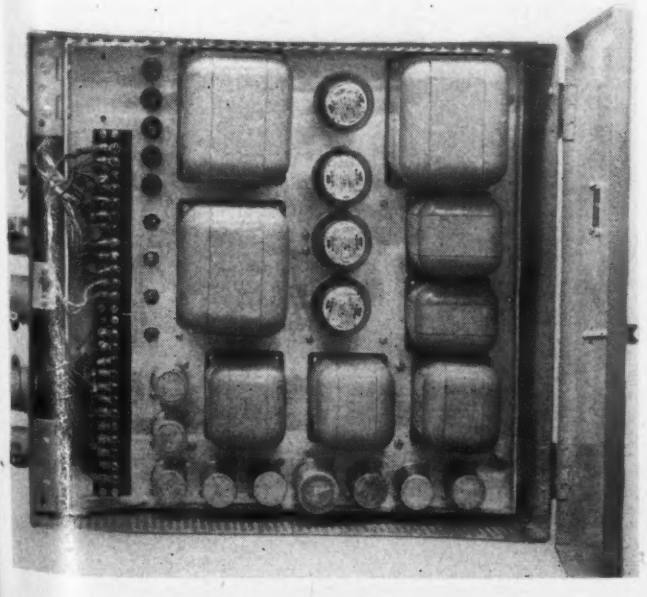
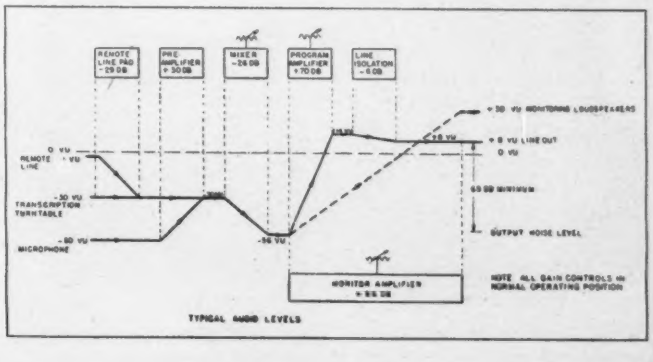


Power supply for the unit is mounted in a separate cabinet wall

Approximate audio levels in consolette for normal broadcast operation



REMOTE AMPLIFIER for

By PAUL WULFSBERG,
Project Engineer,
Collins Radio Co., Cedar Rapids, Ia.

Design of a four channel and master self-contained unit for operation on both AC and batteries

• The design of a remote amplifier for broadcast service involves many interesting problems, some of which are rather unique in audio amplifier design. In most cases programs are sent via telephone lines to the main studios. In some cases, however, a radio link is used. The remote amplifier thus must serve the same purposes as the regular studio console. Light weight, and maximum operating flexibility are required and the fidelity of the amplifier must be comparable to regular studio equipment.

In order to achieve reasonable economy of space and low battery drain, low level mixing generally is used. With new type faders, noise caused during adjustment of volume level is negligible. By use of T type faders very low insertion loss is possible in a four channel system. Four channels and master are adequate for nearly all remote broadcasts.

Since microphones average —60 to —70 db an overall gain of 90 db is adequate for the remote amplifier and allows a moderate reserve of gain which is sometimes useful. An output level of +10VU is normally adequate for all remote pickups.

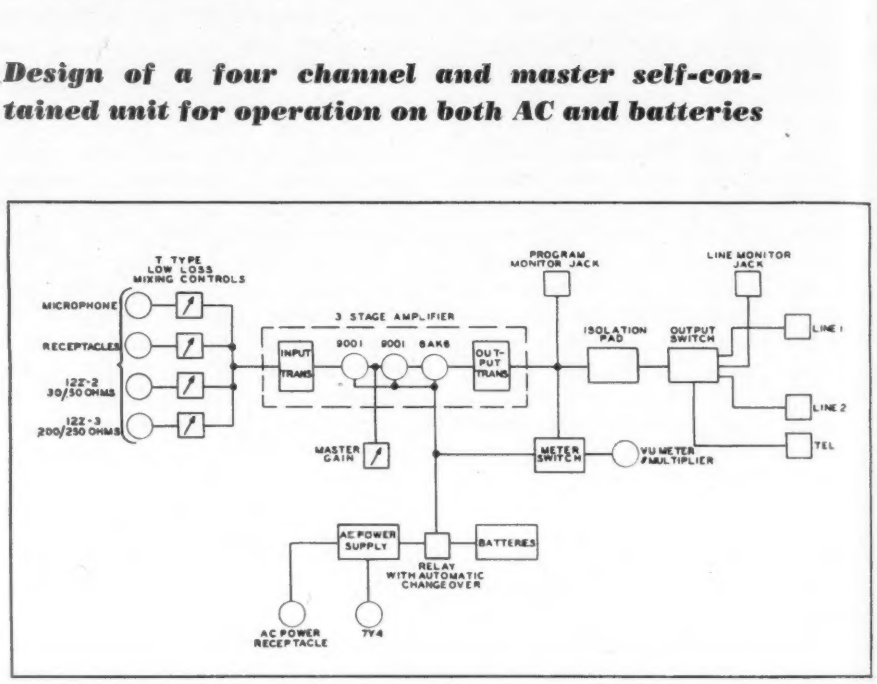


Fig. 4—Block diagram of Collins 12Z amplifier showing automatic AC-battery changeover

From an operational standpoint, the remote amplifier and its power supplies should all be contained in one case, thus eliminating battery and ac power supply boxes and the accompanying cables for interconnecting the units.

The amplifier should provide for either ac or battery operation and automatic cutover from ac to batteries is very desirable to give program protection in case of power line failure. With the above objectives in mind, the design of a new broadcast remote amplifier was undertaken.

The first problem considered in the design was the choice of tubes.

Fig. 1—Front view of complete amplifier unit in its case

Fig. 2—Rear view of the amplifier with the case removed

BROADCAST SERVICE

Since the gain required is 90 db, the total gain of the amplifier, exclusive of the input transformer, needs to be 65 to 70 db. Since the output stage normally has a large step down ratio in the transformer, its net gain is very low, being perhaps only 6 or 8 db. This leaves at least 60 db of amplification to be developed in the preamplifiers. The use of pentodes allows this gain to be realized in only two stages.

Since the preamplifier circuit requires cathode-type tubes for ac operation, the 6.3 volt series is the obvious choice. There are a number of sharp cutoff pentodes in this group which require only 0.150 ampere filament current. Some of the tubes considered were 6W7-G, 7C7, 7AG7 and the 9001 in the miniature series.

The 9001 tube, which is very nearly identical in characteristics to the 6J7 type generally used, was chosen for the preamplifier stages because it is smaller in size than the other types.

Several tubes of low drain characteristics are available which might be used for the output stage. The types 6C4, 6G6G and 6AK6 all have 0.150 ampere filaments. The 6AK6 is a miniature version of the older 6G6G, which is a pentode type tube similar to a 6F6 but having reduced ratings. The 6AK6 (triode connected) was found to be more satisfactory than the 6C4 triode because of lower amplification factor and plate impedance.

The design of the output amplifier brought up several problems. The distortion was not to exceed 1% for typical operating levels (+8 to +10 dbm) at all frequencies. This requirement is easy to meet in the mid-frequency range, but becomes more difficult at frequencies of 100 cycles and below, and at frequencies of 5,000 cycles and above. Inverse feedback seemed a logical method for reducing this distortion.

The 6AK6 was tried as a pen-

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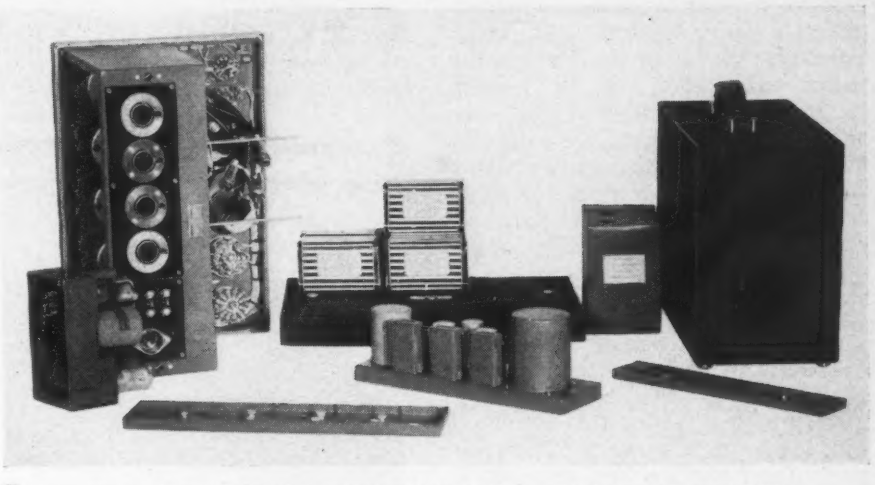
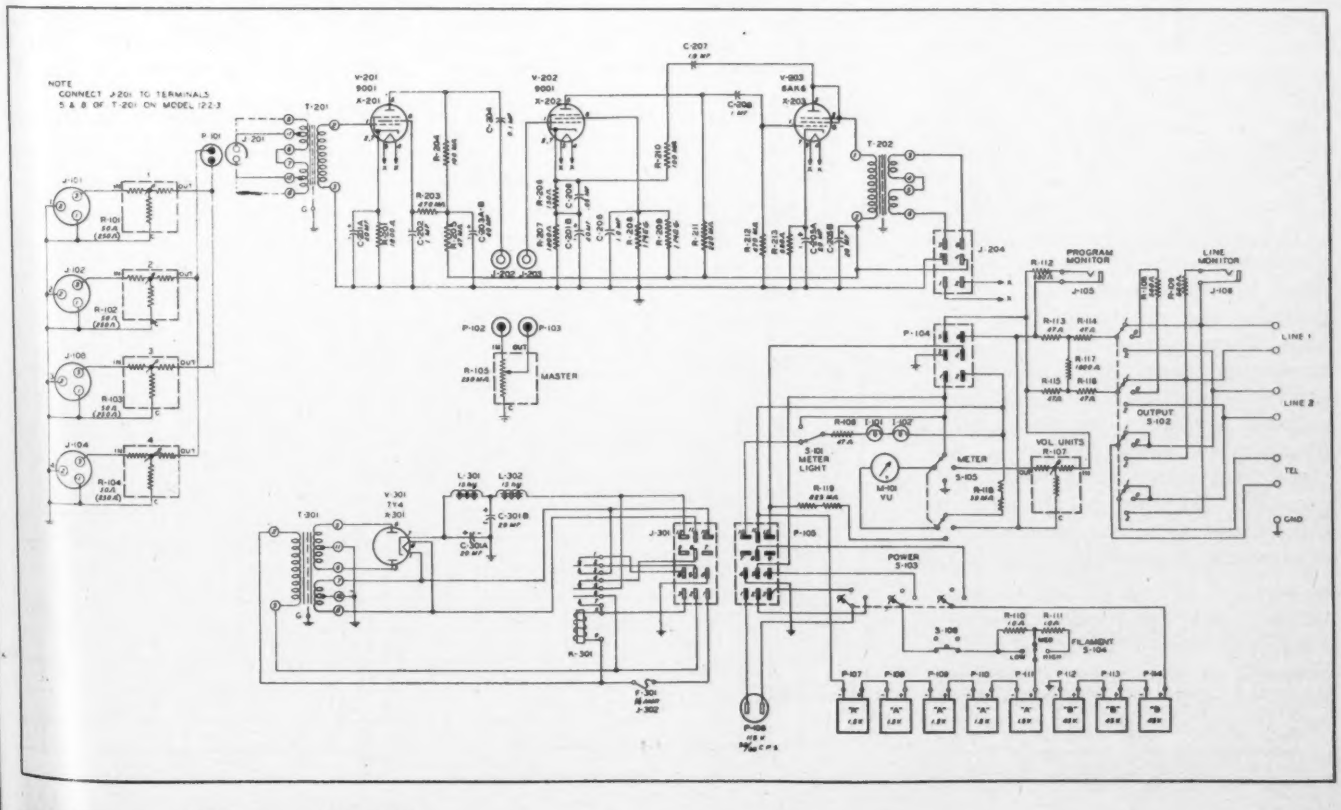


Fig. 3—View of the disassembled unit showing compact design and accessibility

Fig. 5—Complete wiring diagram of the amplifier which provides for master gain and for mixing four input channels



MAGNETIC CONTROL

By C. R. KNIGHT
General Electric Co., Schenectady, N. Y.

External field used instead of conventional grid to regulate plate current in new industrial high vacuum tube

• Although control of electron current flow in a vacuum tube by a magnetic field was described first by Dr. A. W. Hull of the General Electric Co. in 1921,[1] comparatively little practical use of this principle was made until tubes of this type were developed for the generation of extremely high frequencies.

The simplest form of magnetically controlled tube, wherein the flow of anode current is controlled by a magnetic field, can be shown to occupy a logical place in the industrial electronics field. Although there are inherent power losses in a magnetic coil, compared with the negligible power required to control a negative-grid tube, a device of this sort can perform certain functions better and more economically than the conventional types of electron tubes.

At some time or another most designers have wished for a "dc transformer" or a simple means of combining the outputs of several unrelated sources into a single amplification system. Basic limitations of conventional tubes are reached when very low frequency or direct-current voltages of about 1 volt or less are to be amplified.

The magnetically controlled tube circumvents the difficulties encountered in the conventional types by utilizing the magnetic field available when a current flows in a conductor, thus the action of the tube is essentially independent of voltage available for the control. In addition, since control is completely through the magnetic field, complete isolation of the controlling circuit from the anode circuit of the tube is possible. This is not the case in direct-current amplifiers using conventional types.

Fig. 1 (above)—Type 2B23 diode, showing standard intermediate-shell octal construction

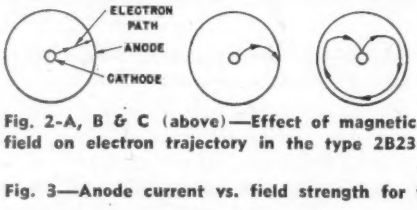
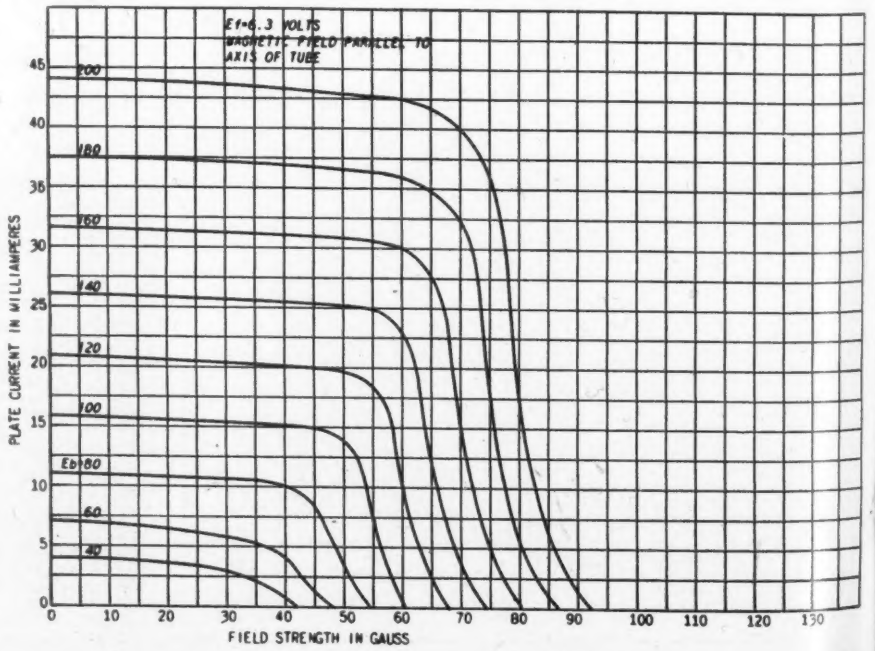


Fig. 2-A, B & C (above)—Effect of magnetic field on electron trajectory in the type 2B23

The recently announced type 2B23 is a diode in which anode current is controlled by a magnetic field, as in Fig. 2. In the absence of such a field, electrons will follow straight radial paths from the cathode to the anode, as shown in Fig. 2A. As the magnetic field is increased, the electrons are deflected from the straight path on a radius of curvature, as in Fig. 2B, which is a function of the magnetic field strength and the anode voltage. Further increase in the magnetic field strength will return the electrons to the cathode, resulting in anode current cut-off, as in Fig. 2C. As field strength is increased the anode current remains substantially constant up to a certain point, then decreases rapidly to zero, as shown in Fig. 3.

The basic circuit for the application of the Type 2B23 is shown in Fig. 4. A magnetic bias field is supplied by the current in L_2 suf-

Fig. 3—Anode current vs. field strength for the type 2B23 at various values of anode voltages



1. Hull, A. W., "The Magnetron," Journal of the A.I.E.E., Vol. 40, pp. 715-23, September, 1921.

   Hull, A. W., "The Axially Controlled Magnetron," Journal of the A.I.E.E., Vol. 42, pp. 1013-18, June, 1923.

   Hull, A. W., "The Effect of a Uniform Magnetic Feld on the Motion of Electrons Between Coaxial Cylinders," Physics Review, Vol. 18, No. 2, pp. 31-57, 1921.

OF ANODE CURRENT

ficient to bring the anode current to the desired operating point. The signal field coil L_1 can be on the same coil form as L_2. The load resistance may be placed either in the anode circuit, as shown, or in the cathode circuit, as the application demands, although in the latter case care must be used to see that the heater-cathode voltage is not excessive.

The circuit of Fig. 5 illustrates an adaptation of the basic circuit to perform the functions of a voltage-control amplifier and a current-limit amplifier in an electronic motor-control circuit, where the output is connected through a suitable circuit to the control element of thyratrons or other devices which are supplying armature power.

Assume that a decrease in this output voltage increases the power supplied to the armature. With no current in L_1, tube V_1 is conducting a maximum plate current. The variable resistance R_4 is adjusted so that the cathode of V_4 is at a potential somewhat more positive than the anode; therefore, V_4 will not be conducting under this condition. The actual setting of R_4 will depend upon the maximum armature current involved. At an instant of time immediately after the closing of the armature circuit,

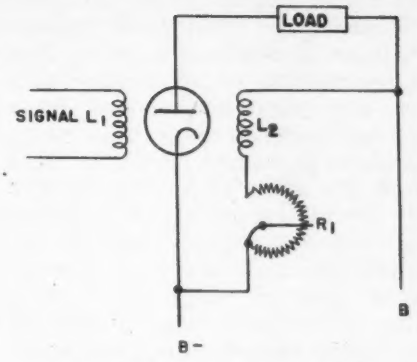


Fig. 4—Basic magnetic control circuit

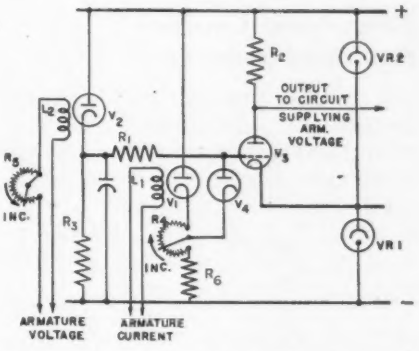


Fig. 5—Motor control circuit using type 2B23

the field on V_2 is zero and V_2 is conducting a maximum plate current.

This anode current, through R_3, produces a maximum grid potential on V_3, which in turn produces a minimum output voltage, whereupon the circuit supplying the armature tends to supply maximum power. At this instant the motor has not started to turn, and its effective resistance is very low. The armature current will rise rapidly until the field supplied to V_1 is increased sufficiently to limit current in R_4 and R_6 to a point where V_4 conducts current. Anode current in V_4 tends to lower the grid potential of V_3, which in turn limits the armature power supplied, thereby limiting the starting current.

As the motor comes up to speed, its effective resistance increases. Since constant current is being supplied, the armature voltage rises until the field supplied to V_2 by L_2 is sufficient to reduce anode current in V_2, causing increased output voltage from V_3 and resulting regulatory action on the armature voltage. The voltage at which this regulation occurs is determined by the setting of R_5.

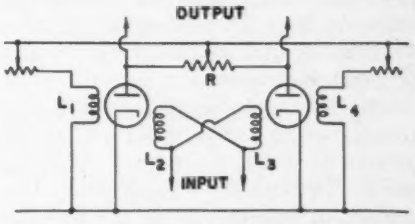


Fig. 6—A stable control circuit using two diodes

In applications requiring greater stability than that provided by the basic circuit of Fig. 4, a combination of two tubes in the manner shown in Fig. 6 can be used. Here the bias field is supplied by the identical coils L_1 and L_4. The signal is fed into coils L_2 and L_3 as shown. Any drift in the bias field strength due to heating up of the bias coils causes an identical anode current change in both tubes. These anode currents flowing through the balance resistor R result in zero net voltage across the extremities of the resistance R. Similarly, any change in tube anode currents due to heater voltage variation in the tubes is almost identical and will cause no change in the net voltage across R. However, when signal voltage is applied to the signal coils, the signal in L_2 adds to the field of L_1, causing a decrease in anode current in V_1 and the signal cur-

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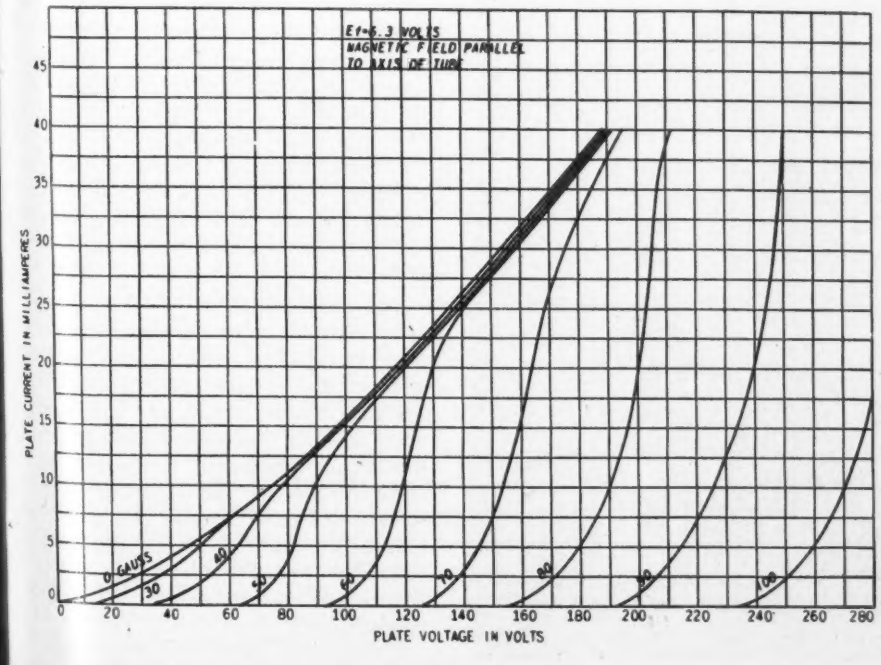
Fig. 7—Family of anode characteristics when field strength is held at various constant levels



TUBES ON THE JOB

Dynamic Balancing

The difficult feat of dynamic balancing of long rotors, where usually a tendency exists for the ends to act independently, is accomplished by the Dynograph balancer, developed by the R. B. Annis Co., Indianapolis, Ind. The Dynograph is a precision electronic device for locating and measuring the two separate components—on each end of the rotor—of dynamic unbalance with a sensitivity as high as one part in one hundred thousand.

The amount and position of unbalance in rotating parts is determined by a single trace on a cathode ray tube. The mechanical vibrations are picked up by flexibly mounted lightweight bearings which vibrate synchronously with the rotation. After conversion to electrical pulses, and amplification, the amount of unbalance is measured directly by the vertical height of the trace on the cr-tube scale.

The two components of dynamic unbalance are separated either by alternate mechanical locking pivots positioned opposite the planes of correction or by adjustment of the vibration pickup units to anode position along a parallel vibration bar. Position of the unbalance is determined by the relative position of an impulse peak on the trace line created by a photoelectric scanning head which projects a focused beam of light onto the work. An identifying spot on the rotor modulates the amount of reflected light reaching the phototube, thus producing a reference peak on the vertical trace line. Rotor speed ranging from 500 to 50,000 rpm can be handled by the Dynograph.

Electronic Control For Projector Arcs

A more precise and reliable method of maintaining a constant arc gap in motion picture projection lamps has been developed by the Forest Mfg. Corp., Newark, N. J., through the use of a pulse generator and a solenoid driven carbon feed system.

A thyratron, operating on 110 volt ac, furnishes impulses to a solenoid to advance both positive and negative carbons at any desired speed. This is done through the action of the solenoid plunger on a pawl which rotates a ratchet gear to turn a worm screw attached to the carrier. The impulses can be set by a control adjustment knob on the generator to values between 20 and 120 per minute.

Since the rate of carbon consumption is very nearly constant, a constant feeding speed of the carrier unit, when properly adjusted to the rate of carbon consumption, will maintain the desired arc gap setting. The control adjustment dial is graduated in amperage, since carbon consumption varies with the arc amperage; and the feeding speed can be set at the exact point required by the arc current.

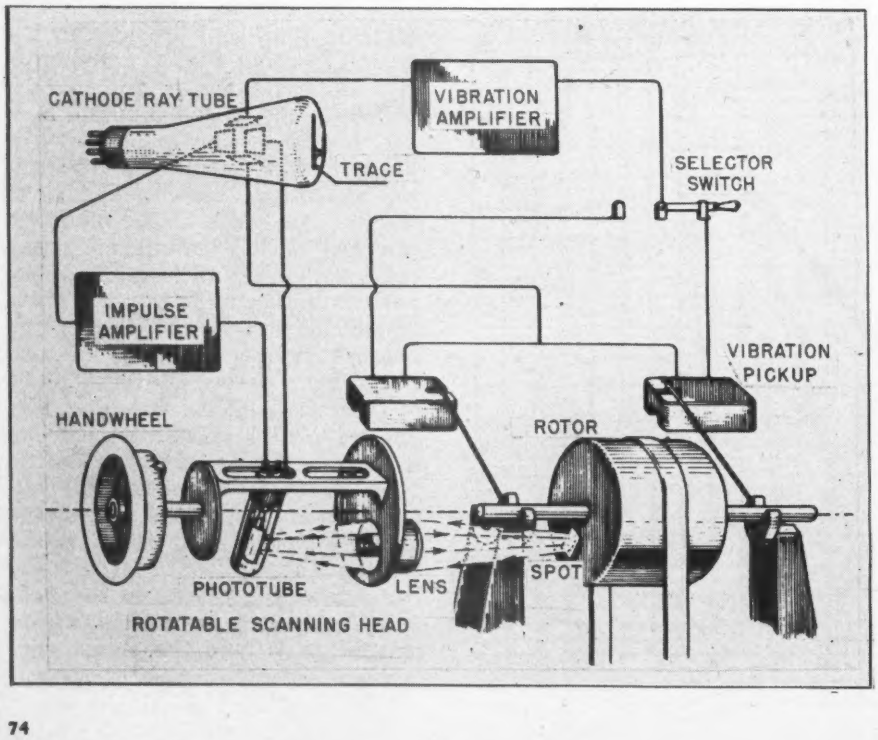
Radio Translator System for Audiences

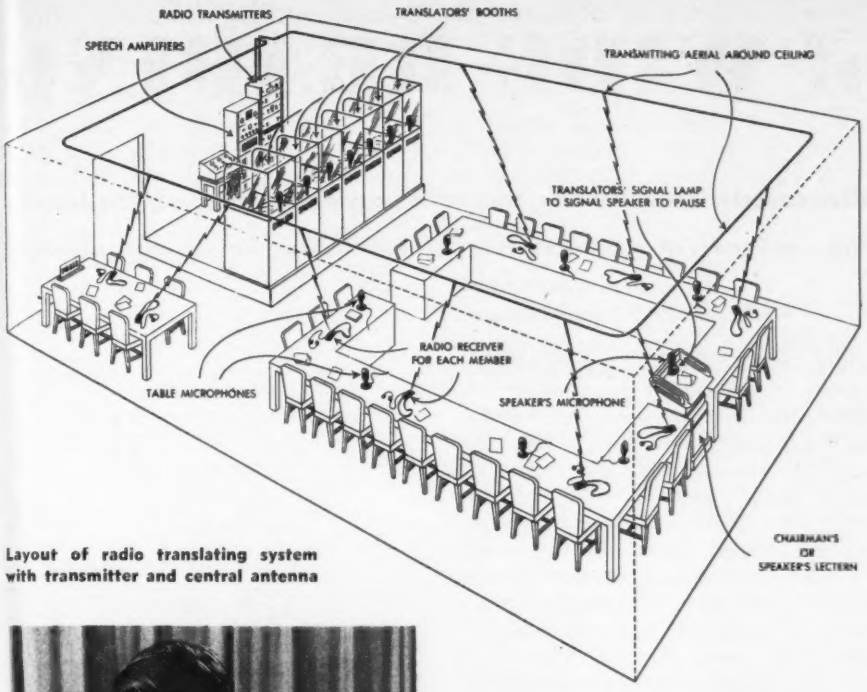
A portable, lightweight radio receiver, used in conjunction with a new system for broadcasting speech translations, permits individual members of an audience to move freely about the auditorium while hearing the speech translations in any one of seven different languages.

A new development of the International Business Machines Corp., the set measures 1⅝ by 4⅛ by 5½ in. high, and weighs only 1½ lbs. The circuit is built around three multifunction tubes, similar to the midget tube developed during the war for the proximity shell fuse. They provide two stages of rf amplification, diode detector with automatic volume control, and pentode output to earphones. The antenna is permanently embedded in a shoulder strap which supports the portable receiver. The set is provided with an on-off switch, a channel switch with which a listener selects the language channel he wants, and a volume control knob.

In the operation of this translator system, the speaker's words are broadcast within the room, picked up by the interpreters in booths at the rear of the auditorium, and translated into several different languages, amplified and re-broadcast to the audience. Eight broadcasting channels are used; a common channel over which all speeches are broadcast to the interpreters and seven language channels.

Schematic diagram of the Dynograph balancer shows the separation of the unbalance components at each end of the rotor to facilitate separate study at the screen of the CRT





Layout of radio translating system with transmitter and central antenna

Any one of seven language channels may be selected with this "camera-sized" receiver

The several transmitters, one for each language channel and the common channel are low power, crystal controlled, and operate at 12.5 kc intervals on band of 100-187.5 kc. The use of low frequency carriers eliminates reflections and fading of signals, and produces a more uniform field throughout the auditorium than can be obtained with higher frequencies. Also, interference with or from existing radio services is eliminated.

The transmitters are all coupled to a single wire loop antenna, placed in the ceiling around the auditorium. Thus all the listeners are located within the field of the loop, and receive maximum signal strength with a minimum of transmission power. Since the field strength outside the loop drops off rapidly, transmission is localized to the participating audience, and the low power used eliminates the need for a radio station license.

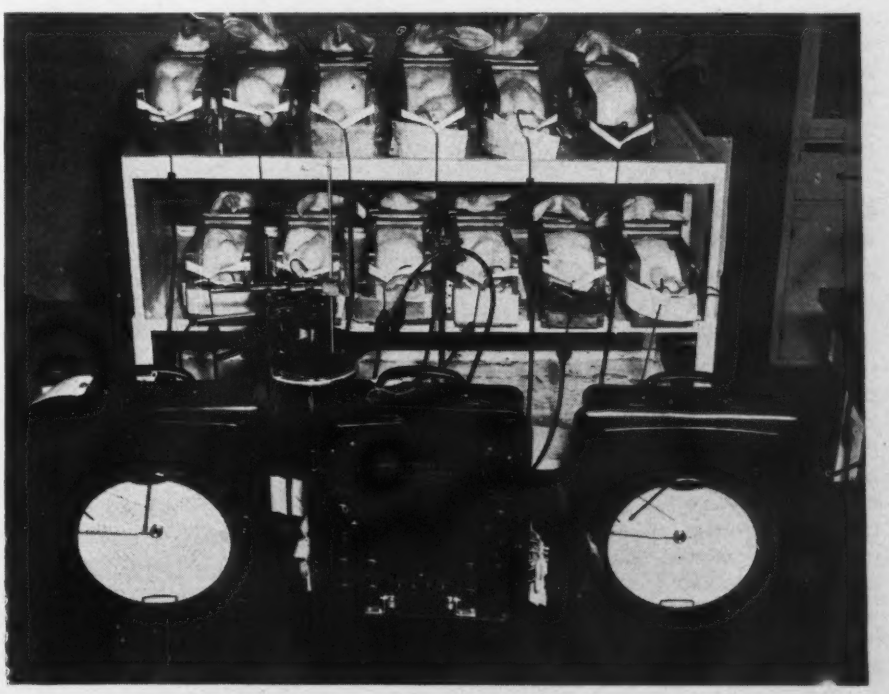
Fever Measurements

A unique use of Dynalog temperature instruments has been found in the measurement of pyrogen content (the temperature raise produced in organic bodies) of penicillin, streptomycin and other infusion fluids. Every batch of these chemicals must pass exact standards of the Food & Drug Administration for pyrogen content before being released for human use.

The test for pyrogen content usually is conducted by inoculating some of the fluid into the veins of an ear of a rabbit. The animal's temperature is then recorded four times in four hours, the maximum allowable temperature rise being below 0.6° C.

In order to reduce the manual operations necessary in recording temperature readings of a large group of test animals, Edison-Splitdorf Corp., West Orange, N. J., and Foxboro Co., Foxboro, Mass., jointly have developed an automatic indicating-recording fever thermometer for rectal use. By use of the equipment including a Foxboro scanning switch and the indicating fever thermometers—based on the well-known Dynalog instruments—12 rabbits are kept under test at the same time. Readings are automatically recorded on standard graph paper. The recording indicator uses a voltage unbalance circuit for control and is accurate to within 0.1°C. A unique feature of the Dynalog electronic circuit is the comparison of the bridge unbalance to a standard frequency which is also supplied to the Wheatstone bridge. Thus balance control, detection of direction of unbalance and detection of amount of unbalance are accomplished in one tube. No mechanical multiplication is needed. The fever bulbs are two in. long, ⅛ in. wide, and are made of silver, which is gold plated to resist corrosion. They are left in place for the entire test period.

A group of twelve rabbits is tested periodically for temperature rise by means of specially designed fever bulbs in conjunction with Foxboro Dynalog instruments and a scanning switch



SURVEY of WIDE READING

Electronic news in the world's press. Review of engineering, scientific and industrial journals, here and abroad

Properties of Mixed Dielectrics

R. Vieweg and Th. Gast, Institute fuer technische Physik, Technische Hochschule, Darmstadt (Zeitschrift fuer technische Physik, Berlin, 1943, No. 3, pp. 56 to 62).

To establish the dielectric constant ϵ of powders or fibers the dielectric constant ϵ_m of a mixture of the powder or fiber with another dielectric of known dielectric constant ϵ^1 can be measured and the dielectric constant ϵ computed from ϵ_m and ϵ^1. The dielectric constant ϵ_m of the mixture depends on the dielectric constants ϵ and ϵ^1 of the components, their respective volumes, and the size and shape of the particles making up the mixture; in extreme cases, the equivalent capacitance is a parallel or series connection, respectively, of the two components.

In the present article experiments are described where air is being used as the known dielectric and the dielectric constant of the air varied by application of varying pressure. A self-balancing bridge circuit was designed for the registration of the capacitance-pressure curves. Curves presenting the change in the dielectric constant of the mixture and of pure air, respectively, with variation in pressure were taken. These data permit the evaluation of ϵ by formulas given in the article.

Design and Performance of the 6AK5 Tube

G. T. Ford (The Bell System Technical Journal, July 1946, pp. 385 to 407)

The Western Electric 6AK5 tube, intended for the broadband IF amplifiers of radar receivers, is designed for high transconductance, low capacitances, high input resistance, and good noise figure, indicating the desirability of close grid-cathode spacing, fine grid wires, short lead wires, small elements and large cathode emission. Attention is given particularly to the effect of the various electrode spacings on the band merit (bandwidth times mid-band amplification factor for resonant frequency); it decreases rapidly with increasing cathode-grid spacing. A 0.089 mm spacing was decided on, resulting in a band merit of 117 for the 6AK5. Grid-screen and suppressor-plate distances have less influence on tube performance; larger values seem to improve the band merit; values of 0.32 mm and 1.62 mm respectively were chosen. The control-grid pitch is 0.0127 mm, and the wire size 0.0010 in. Cathode lead inductance is estimated at 0.02 micro-henry, the mutual conductance is given as 5×10^{-3} mhos, and the grid-cathode capacitance is 4×10^{-12} farad.

The curve represents the average value of the input conductance as

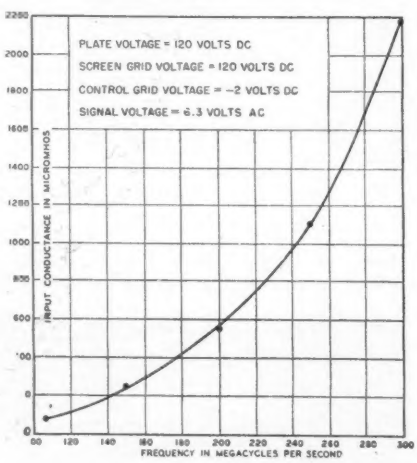


PLATE VOLTAGE = 120 VOLTS DC
SCREEN GRID VOLTAGE = 120 VOLTS DC
CONTROL GRID VOLTAGE = −2 VOLTS DC
SIGNAL VOLTAGE = 6.3 VOLTS AC
INPUT CONDUCTANCE IN MICROMHOS
FREQUENCY IN MEGACYCLES PER SECOND

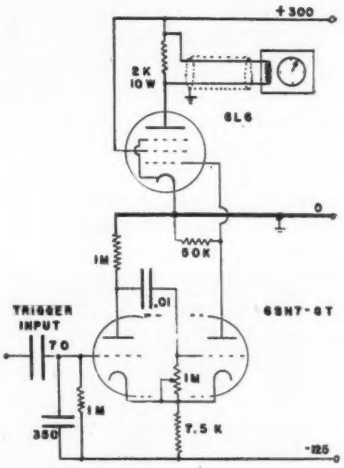
Input conductance of 6AK5 tube as function of frequency (Naval Research Laboratory)

a function of frequency for six 6AK5 tubes as tested by the Naval Research Laboratory. Approximate computations indicate that at an operating frequency of 250 mc the input conductance is largely due to the cathode lead inductance while the transit time effect contributes only a small fraction.

Pulse Recorder

B. E. Watt (The Review of Scientific Instruments, September 1946, pp. 338 to 342)

The high speed pulse recording circuit shown in the diagram may



be used to operate a Ceno low impedance mechanical counter at more than 130 counts per second. The two sections of the 6SN7-GT operate as a gate generator, the 6L6 as current amplifier. Details of circuit operation are given.

Electrostatic Field of Electron Beam

F. Borgnis, I. Physikalisches Institut der Universitaet in Graz, Austria (Annalen der Physik, Berlin, Vol. 43, No. 5, pp. 616 to 629)

The electrostatic potential and field distribution inside and outside a circular cylindrical electron beam—traversing the space between two conducting planes A and B which are at equal potential—is studied. The problem arose in connection with the investigation

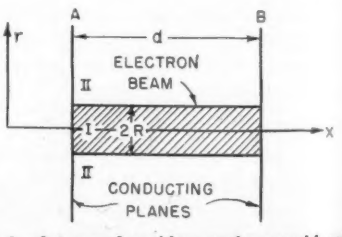


Fig. 1—Set-up of problem under consideration

of the space charge effect on the focussing properties of a density-modulated electron beam. A general solution, assuming the density to be a known function of x, the direction of electron travel, ex-

clusively, is found; the expressions for the field components, which involve fast converging series of Bessel functions, are derived.

Simplification of the problem by assuming a constant electron density throughout the beam, which is warranted for fast traveling electrons, permits numerical evaluation. The lines of force, illustrated in the second figure for a

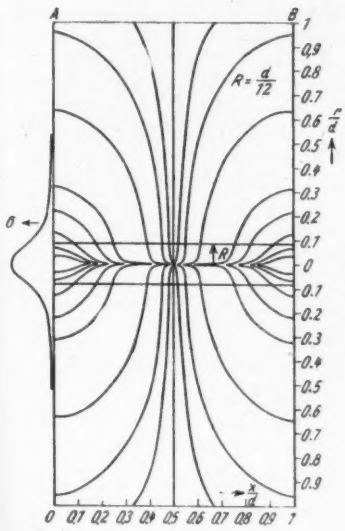


Fig. 2—Electrostatic lines of force due to constant density electron beam

ratio of beam radius to beam length R/d = 1/12, and the electric field intensities along the axis, illustrated in the third figure with R/d as parameter, were computed in this way. R/d equal to infinity corresponds to the case where the space between the plans A and B is completely filled with evenly distributed space charge.

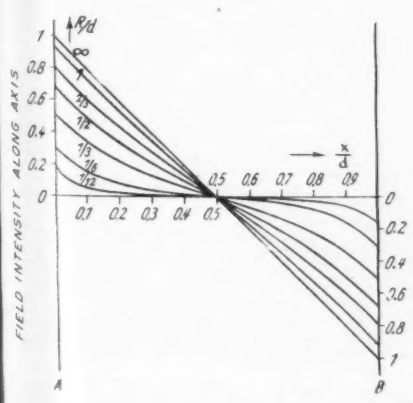


Fig. 3—Field intensity along axis of constant density electron beam

From Fig. 2, it can be seen that there is only an axial field component at the beam axis which is zero at the mid point, while strong radial fields prevail at a distance from the beam axis, particularly in the center region. σ indicates the charge density on the electrode. The reduction in the field strength caused by space charge with a reduction in beam radius is clearly demonstrated in Fig. 3.

The special cases of a point charge and of a space charge cylinder situated inside a metal cylinder are considered.

Mathematics of Paraboloidal Reflectors

E. Pinney (Journal of Mathematics and Physics, February 1946, pp. 49 to 79)

Radiation within a paraboloidal reflector follows the laws of geometrical optics only if the reflector diameter is large compared with the wavelength. Considerable deviations from the computed results are observed at diameters of ten to fifteen wavelengths and it is therefore indicated to derive more accurate formulas. The article is concerned with the properties of Laguerre's function and Laguerre's polynomial which constitute solutions of the scalar wave equation in paraboloidal coordinates and therefore are essential to the mathematics appropriate to describe the electromagnetic field within a paraboloidal reflector.

Oxide Coated Cathodes

J. P. Blewett, E. A. Coomes, A. Eisenstein, A. Fineman and A. Eisenstein (Journal of Applied Physics, August, 1946, pp. 643 to 668).

A series of articles entitled "Oxide Coated Cathode Literature, 1940-1945", "Pulsed Properties of Oxide Cathodes", "Study of Oxide Cathodes by X-Ray Diffraction Methods", and "Studies of the Interface of Oxide Coated Cathodes" by the authors mentioned above, respectively, reports recent research on the properties and theory of oxide coated cathodes. Particularly the behavior at pulsed operation is studied. It appears that a layer model is best suited to explain the observed phenomena. In this model a crystalline blocking layer interface separates the base metal from the semi-conducting oxide which is covered by a surface layer.

Matching Load to Tube Oscillator

R. E. Burgess (Wireless Engineer, London, September 1946, pp. 237 to 240)

A tube oscillator is a non-linear power source. Therefore, conventional network theorems do not apply and special formulas had to be derived to investigate its operating characteristics, particularly power transfer to a resistive load.

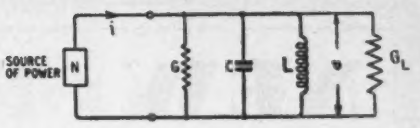


Fig. 1—Schematic of tube oscillator and load

The circuit considered (Fig. 1) consists of a negative conductance element, N, and the oscillatory circuit incorporating conductance, G, capacitance, C, and inductance, L. It is assumed that the current-voltage characteristics of the negative conductance element, N, have the form:

$$i = -av + bv^{2n+1} ,$$

where i is the current, v the voltage, a and b are constants, and n is a positive integer. From the second figure, which illustrates the

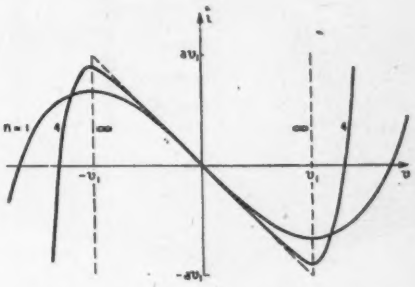


Fig. 2—Voltage-current characteristics of nonlinear element N

characteristics for different values of the parameter, n, it will be seen that a for practical purposes sufficient variety of current-voltage characteristics is covered by this formula. The two turning values, v_1 of v, for which the current assumes a maximum or minimum, respectively, are given by:

$$v_1 = \pm \left(\frac{1}{2n+1} \cdot \frac{a}{b} \right)^{1/2n} .$$

For the calculation of the amplitude and power relationships it was assumed that the potential difference, v, across the oscillatory circuit is a pure sine wave

$$v = A \sin \omega_0 t .$$

Then it can be shown that the amplitude A will be equal to

$$A = v_1 \left(\frac{2n+1}{F_n} \cdot \frac{a - G}{a} \right)^{1/2n} ,$$

where F_n

$$F_n = \frac{3 \cdot 5 \cdot \ldots \cdot (2n+1)}{4 \cdot 6 \cdot \ldots \cdot (2n+2)} .$$

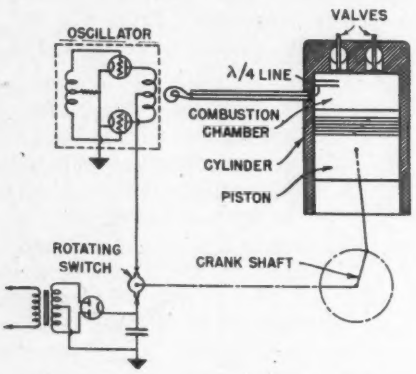
In the limiting case of G = O the

(*Continued on page 108*)

NEW PATENTS ISSUED

Ignition System

A resonant system is provided inside the combustion chamber of an internal combustion engine. High frequency energy is supplied to the resonator by an oscillator, which is synchronized with the operation of the engine so that discharge of the resonant system occurs at the top of the compression stroke at which instant the rotating switch will be closed.



The resonant system comprises a quarter-wave line fed near the shorted end next to the combustion chamber wall. Discharge takes place at the voltage antinode across the open end of the line. Alternatively the combustion chamber may be formed as a resonant cavity at the instant of maximum compression and the discharge take place between two metal parts protuding from the movable piston and the opposing wall of the combustion chamber, respectively. Energy is supplied to the resonant chamber by a coupling loop fed by the high frequency oscillator.—W. W. Eitel, Eitel-McCullough, Inc., (F) Oct. 11, 1943, (I) June 25, 1946, No. 2,402,539.

Bomb Steering Mechanism

The bomb or projectile the path of flight of which is to be controlled from a plane is equipped with two reversible motors for left-right and up-down steering, respectively. A tube and relay circuit is so connected as to rotate one of the motors in either direction in response to a specified audio frequency. Four resonant circuits responsive to four different audio frequencies are provided for the four desired operations, respectively. A fifth frequency and corresponding relay may be included for secrecy.

It is further proposed to steer the vertical course and the horizontal course from separate airplanes flying in suitable paths for observing vertical and horizontal deviations from the desired bomb path. Each airplane is equipped with apparatus permitting horizontal and vertical control; however, only one of these controls may be in operation in each plane. To obviate interference of two carriers simultaneously received by the bomb antenna, the signals from one plane may be referred to the other plane and both signals used to modulate one carrier simultaneously.

M. G. Clay, (F) February 4, 1942, (I) March 26, 1946, No. 2,397,088.

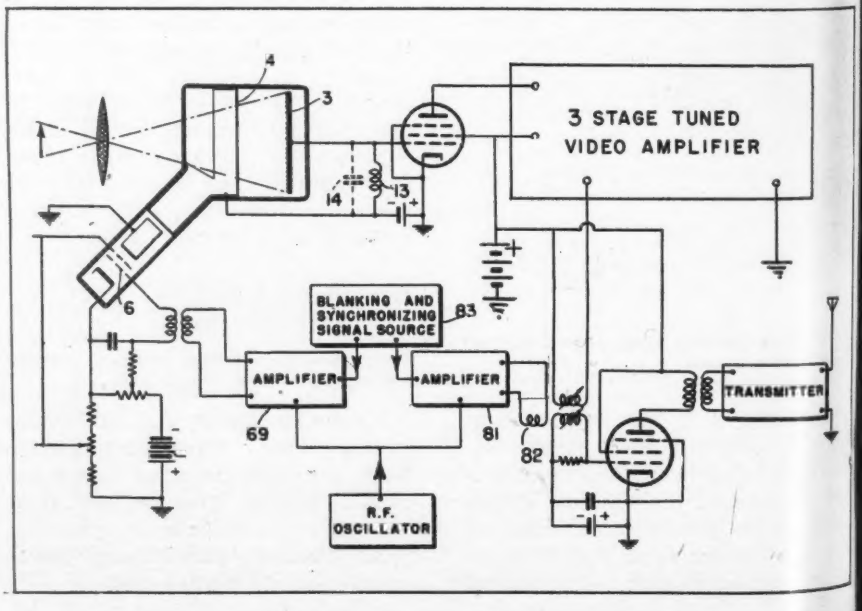
Iconoscope Generating AM RF Carrier

According to the present invention, the electron beam intensity is modulated by a radio frequency voltage applied to control grid 6. Consequently the iconoscope output will consist of a radio frequency carrier, the amplitude of which is modulated by the picture signal. An advantage of the system is that the dc picture component corresponding to the mean picture brightness is generated and amplified simultaneously with the ac component obviating the necessity for a separate dc restoring device. Only a small percentage—10% at the most—modulation is secured, however, so that to increase the modulation amplitude, a tuned, wideband video amplifier is inserted between the iconoscope output circuit and the transmitter. Inductance 13 and capacitance 14, representing the capacitance between the signal plate 3 and the collector anode 4 are tuned to resonance at the carrier frequency. Resonant circuits alternately tuned to the carrier and to the limiting upper side band frequency provide coupling between the video amplifier stages so that a bandpass characteristic is obtained. The unmodulated portion of the carrier is eliminated by operating one stage as a class C amplifier. During retrace intervals the electron beam is suppressed and a synchronizing signal supplied to the transmitter via transformer coil 82, while during scanning the synchronizing signal is blocked, amplifiers 69 and 81 being operative at alternate time intervals.—L. F. Mayle, Farnsworth Television and Radio Corp., (F) January 10, 1944, (I) May 28, 1946, No. 2,401,010.

Split-Anode UHF Oscillator

In the split anode oscillator (see figure on p. 105) the circumferential lengths of the anode segments are an odd multiple of one-half wavelength. These anode segments define inductances while the gaps between them define capacitances. The oscillation frequency generated by the tube depends on the circumferential dimension of the anode segments and no external, tuned circuit with associated losses is needed.

(*Continued on page* 105)



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NEWS OF THE INDUSTRY

IRE Show Moves To Grand Central

Location of the 1947 Radio Engineering Show to be staged by IRE has been changed. The show is to be held in Grand Central Palace instead of the 17th Regiment Armory, which it outgrew. There will be no change in the dates which remain March 3 to 7. The change in location, which makes available a great deal more space than the Armory provided, permits the addition of some 25 manufacturers to the list of exhibitors. At the same time Grand Central Palace is more accessible from the Hotel Commodore where Convention sessions will be held.

Power Show Promises Electronic Applications

It is expected that the 17th national exposition of Power and Mechanical Engineering scheduled for New York's Grand Central Palace during the week of December 2 through December 7 will hold much of interest for electronic engineers. There are to be nearly 400 exhibits, many of them featuring various forms of electronic control. Exhibit classifications cover the subjects of power generation, conversion, distribution and application to productive machines and equipment.

To Promote Teleran

For the better development and promotion of Teleran, new air navigation system, Radio Corp. of America has brought together a special engineering group which will be headed by Dr. Douglas Ewing as chief Teleran engineer. Included in the group are P. J. Herbst at Camden, and Dr. Irving Wolff at Princeton. Dr. Ewing formerly was assistant director of MIT's Radiation Laboratory. Coordination of the development plan will be under the general direction of Loren F. Jones who is manager of research and development projects for RCA.

Hughes Drops FM and TV

Howard Hughes, noted aviation engineer, is out of TV and FM. He asked the FCC to withdraw his applications for FM and television stations at Los Angeles. The request was granted.

NEW IRE PRESIDENT

Dr. W. G. R. Baker, vice president of General Electric, and newly elected president of IRE

Baker Heads IRE

Dr. W. R. G. Baker, president of General Electric Co. in charge of electronics, has been elected president of the Institute of Radio Engineers. He succeeds Frederick B. Llewellyn of Bell Telephone Laboratories.

Noel Ashbridge, deputy director-general of the British Broadcasting Co. was elected vice president. Three new directors are Murray G. Crosby, consulting engineer of the Paul Godley Co., Upper Montclair, N. J.; Raymond F. Guy, radio facilities engineer, National Broadcasting Co.; and Raymond A. Heising, patent engineer, Bell Telephone Laboratories.

NAB Hears of Future BC Expansion fom Jett

While most of the sessions attended by the 2,000 delegates to the Chicago convention of the National Association of Broadcasters, Oct. 21 to 24, were taken up with commercial and administrative topics of advertising policies, programming, audience measurements and FCC relations, engineers present took part in enlightening discussion of FM, pulsetime modulation, and facsimile.

Elaborate apparatus exhibits presented by the manufacturers particularly featured television equipment, in addition to AM, FM, and facsimile. All convention sessions were televised by Chicago Station WBKB and RCA, under the direction of Capt. W. C. Eddy.

Radical changes which broadcasting faces, were outlined by Commissioner E. K. Jett, who forecast that wireline networks may disappear and every service may be shifted in the spectrum. Pulse-time modulation technics, while not available for present AM and FM systems, may provide broadcast-station interconnections, when applied to microwave frequencies.

Microwave relays at 3700 to 13,000 mc, declared commissioner Jett, may prove more efficient than wirelines or coaxial cables, for distribution of AM, FM, television and facsimile programs of high technical quality.

Jett also forecast increased tube sizes on frequencies below 1,000 mc, reaching up to units of 50 kw per tube. Resonant-cavity magnetrons, he said, are efficient at frequencies

Conventions and Meetings Ahead

67th Annual Meeting of the American Society of Mechanical Engineers—Hotel Pennsylvania, New York City, December 2-6.

17th National Exposition of Power and Mechanical Engineering—Grand Central Palace, New York City, December 2-7.

American Society for X-Ray and Electron Diffraction — Winter meeting University of Pittsburgh, Dec. 5, 6, 7. (Dr. S. S. Sidhu, University of Pittsburgh.) Joint Meeting with E.M.S.A.

Electron Microscope Society of America—Winter meeting, Mellon Institute of Industrial Research, Pittsburgh, Pa. December 5, 6, 7. (Dr. Earl A. Gulbransen, Westinghouse Research Laboratories, East Pittsburgh, Pa.) Joint meeting with A.S.X.R.E.D.

Materials Handling Exposition—Public Auditorium, Cleveland, Ohio, January 14-17, 1947.

Electrical Engineering Exposition —71 st Regiment Armory, New York, January 27 to 31, 1947.

7th International Heating and Ventilating Exposition — Lakeside Hall, Cleveland, Ohio, January 27-31 concurrently with the **53rd Annual Meeting of the American Society of Heating and Ventilating Engrs.**

American Society for Testing Materials—Spring Meeting—Benjamin Franklin Hotel, Philadelphia, Pa., February 24-28, 1947.

Institute of Radio Engineers—Annual Meeting (Commodore Hotel) and Show (Grand Central Palace), New York, March 3-7.

ranging from 600 to 10,000 mc, and will provide the basis for many postwar circuits.

FCC Chairman Denny, in a panel discussion, reasserted that the FM allocation at 88 to 108 mc is final, implying that the FM low band may soon be abandoned, despite the large number of sets in operation and still being built with low-band FM tuning. Papers of engineering interest presented during the sessions included: **"FM Transmitter and Receiver Status"**, Dr. W. R. G. Baker, General Electric Co.; "FM Station Engineering", T. A. M. Craven, Cowles Broadcasting Stations; "Facsimile Broadcasting", Capt. W. G. H. Finch, Finch Telecommunications, Inc.; "Facsimile and the Broadcaster", John V. L. Hogan, Radio Inventions, Inc.

Kinzel Again Heads Engineering Foundation

Dr. A. B. Kinzel has been re-elected chairman of the Engineering Foundation. He is vice-president of the Union Carbide and Carbon Research Laboratories, Inc., and of the Electro Metallurgical Co. and is an internationally known metallurgist. Other officers elected were: Vice-chairman, Dr. L. W. Chubb, director of the Westinghouse Research Laboratories; Dr. Edwin H. Colpitts, formerly vice-president of the Bell Telephone Laboratories; Secretary, John H. R. Arms.

The Engineering Foundation is one of the departments of the United Engineering Trustees, Inc., a corporation which was set up jointly by the four national engineering Founder Societies with an aggregate membership of over 88,000. These are: American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, The American Society of Mechanical Engineers, and the American Institute of Electrical Engineers.

Buffalo Gets FM

At least two Buffalo, New York stations will take to the air shortly with FM. WBEN and WBNY anticipate program service this month and in January respectively.

WBEN will use a 3 kw Federal Telephone & Radio FM transmitter and a square loop antenna mounted on top of the Hotel Statler, according to Chief Engineer Kingsley. All studio amplifier equipment has now been replaced by high

(*Continued on page* 118)

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WASHINGTON

★ ★ ★ **Latest Electronic News Developments Summarized by *Electronic Industries'* Washington Bureau** ★ ★ ★

EFFECT OF REPUBLICAN VICTORY ON FCC—Since the FCC is a special province in Washington of the electronics-radio industry, the fate of the Commission in the face of a Republican-controlled Senate and House is important in view of the promised economy axe-wielding. But there is felt to be little real chance of any House investigation of the FCC. Actually, little industry support of such a move is in the offing. Due to the fact that the present Commission, under the leadership of Acting Chairman Denny, and with such an able engineering associate as Commissioner Jett, is functioning more efficiently, and more in the interest of the communications-broadcasting industries than ever before, the FCC could come away from a Congressional microscope with a record of real accomplishment, especially in regard to its engineering functions.

PARED APPROPRIATIONS—Previous aim of FCC to secure an increased allotment of funds of the tremendous rise in its work—some 430,000 applications for stations, amateur and operator licenses since the end of the war—appears pretty much doomed. But the Commission is going to make a strong presentation before the House and Senate Appropriations Committees for retention of its present funds. No one can predict at this time, before the beginning of Congress, how its attempt will come out, but, if the Republican victors do desire to retain essential government activities, necessary to the proper functioning of the broadcasting and communications services, its chances are fairly good. Following are some of the reasons why the FCC is going to contend with Congress for what it considers legitimate functions.

WORLD CONFERENCES—Frequency Allocation Division of FCC under Captain Paul Miles, Navy veteran, will be occupied day and night in formulating the United States position, together with industry experts, for the coming frequency allocations parley, then the world telecommunications conference and finally the meeting on high-frequency radiocommunications and short-wave broadcasting. The FCC staff experts work with the State Department, Army, Navy, and CAA and their planning is carried on with the full cooperation and participation by the communications-broadcasting-radio manufacturing industries.

FERTILE FIELD IN MOBILE SERVICES—Manufacturers, who have entered the mobile radiotelephone field, will some day find real gold in "them thar hills". This service is just starting towards its fruition and the FCC figures prove it. There have been 26,000 land and mobile stations granted to date by the Commission with thousands coming in daily. But, due to equipment manufacturing difficulties, there are comparatively few units in actual operation. Telephone companies, buses, trucks, taxicabs and other large vehicular users are all showing their intense interest. To illustrate the "gold", FCC recently granted two Pacific Coast taxicab companies stations which will cost $1,500,000. Next problem will be on overcrowding assigned frequencies and rising possibilities of interference.

AVIATION SAFETY AIDS—PICAO studies which were held in November at Montreal, following the demonstration of aviation radio-radar-electronic navigation and traffic control aids at Indianapolis, were most significant for U.S. manufacturing industry. If American systems are generally adopted as the world standard, there is the potentiality of a billion dollar market during the next decade in the United States alone and possibly another billion throughout the rest of the world. Standards of global systems, it is proposed by PICAO, are to prevail for next five years at least. Most important development at PICAO sessions was indication that the operating standards and frequency plan of the U.S. Radio Technical Commission for Aeronautics should be the basic foundation for the world aviation radio navigation aids blueprint.

SEA SAFETY PRESENTS BIG FIELD—Establishment of a government-industry advisory and policy organization for marine navigation radio-radar-electronic aids to map out the best systems of radar, loran and shoran particularly, similar to the Radio Technical Commission for Aeronautics, has been proposed in the highest U.S. government quarters. FCC has created a Special Marine Safety Survey Group to make a comprehensive survey of radio communications and radio aids to aid safety of life and property at sea. The view is that a separate Marine Radio Safety sea conference should follow the world telecommunications conference, slated to be staged in this country next July.

SHOALS AHEAD—Ever since the settlement of the dispute with GE and Westinghouse, labor troubles in the radio-electronics manufacturing industry have been quite dormant. But authoritative observers in Washington felt, as this issue went to press, union unrest was simmering in view of the rising cost of living and added impetus was given by the strikes in the maritime and other major industries.

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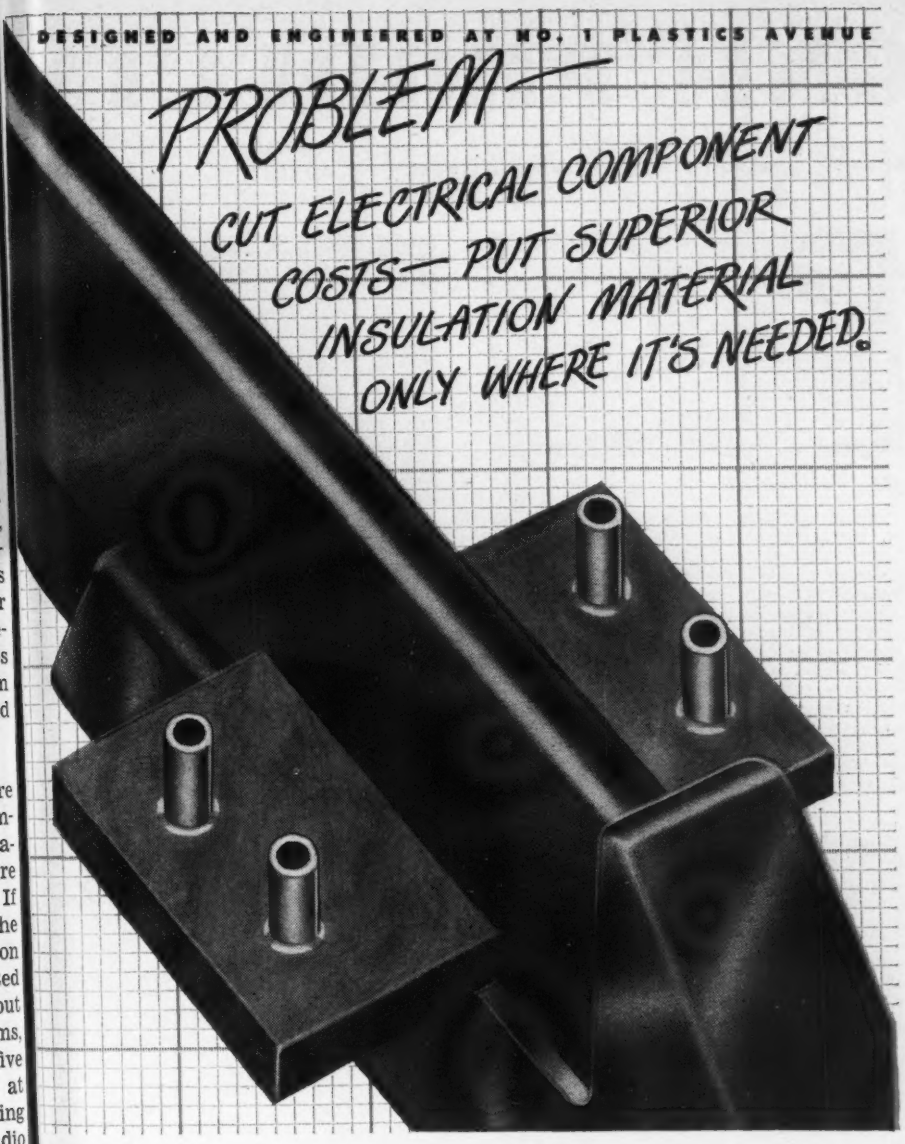
ROLAND C. DAVIES
Washington Editor

DESIGNED AND ENGINEERED AT NO. 1 PLASTICS AVENUE

PROBLEM—
CUT ELECTRICAL COMPONENT COSTS—PUT SUPERIOR INSULATION MATERIAL ONLY WHERE IT'S NEEDED.



G-E MYCALEX—the insulator that can be bonded in an insulator

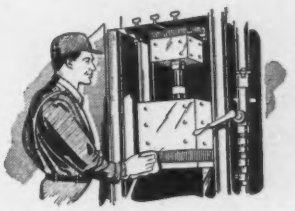
●This rectangular piece of G-E mycalex plays a vital part in the cutouts that protect street lighting circuits from overloads. The design of the cutout calls for insulation material with a superior combination of properties that can be molded as an insert into a less expensive red phenolic plastics part. To meet these requirements, G-E mycalex was selected—a compound of glass and mica that withstands the frequent voltage stresses of the application and stays resistant to heat, moisture, and arcing.

Metal studs are firmly molded into the G-E mycalex, and the G-E mycalex insert itself is securely anchored in the phenolic plastic. New and improved designs for electrical components are possible with these two unique features. And in many cases, lower costs are an additional result.

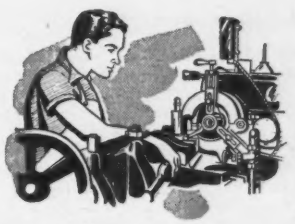
General Electric engineers will be glad to advise you on the uses of G-E mycalex—will mold parts to your own design. Learn the full story of this unique insulating material by sending for our new bulletin—"G-E Mycalex." Write to Section T-16, Plastics Divisions, Chemical Department, General Electric Company, 1 Plastics Avenue, Pittsfield, Massachusetts.

HOW THE G-E MYCALEX SERVICES CAN BENEFIT YOU NOW

You may order fabrication of sample G-E mycalex parts at surprisingly low cost. Test them yourself in your own equipment. Then, if you decide to specify G-E mycalex, your design can be converted to a molding process which permits speedy and economical production runs.



MOLDING SERVICE



FABRICATING SERVICE

Get This Unique Combination of Properties with G-E Mycalex

1. High dielectric strength
2. Low power factor
3. Prolonged resistance to electrical arcs
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5. Dimensional stability—freedom from warpage and shrinkage
6. Impervious to water, oil, and gas
7. Resistance to sudden temperature changes
8. Low coefficient of thermal expansion
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Samples Supplied on Request

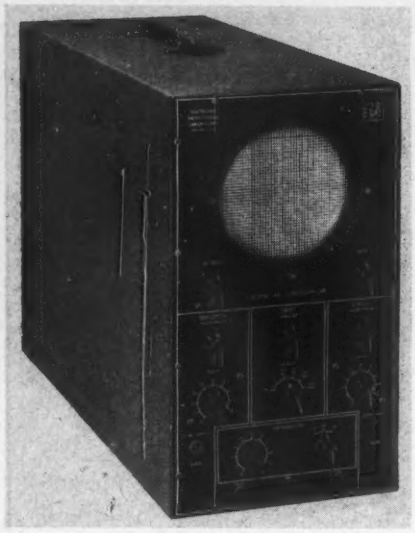
GE MYCALEX

GENERAL ELECTRIC

CD46-M16

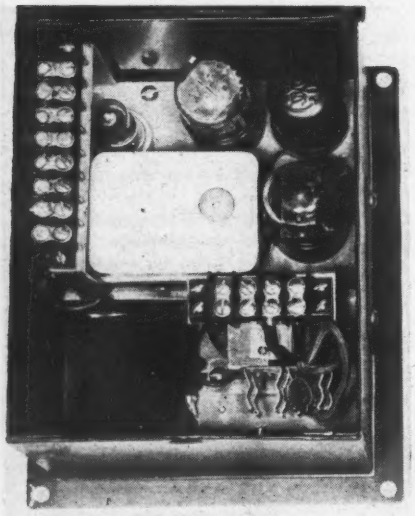
ELECTRONIC PRODUCTS

Parts, components, materials the manufacturers offer



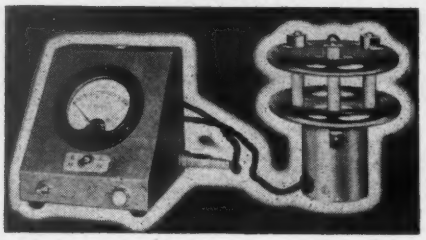
CR Oscilloscope

Model 49 cathode ray oscilloscope is a new version with improved linearity of sweep, synchronization control and excellent square wave response. Five tubes are used for vertical and horizontal amplification, for the sweep oscillator and for rectification. Frequency response ranges from 10 cycles to 300 kc, the sweep range being from 10 cycles to 60 kc in 4 steps. Deflection sensitivity of the unit is 1 volt rms per in. **Electronic Development Laboratory, 2655 W. 19th St., Chicago 8, Ill.**—Electronic Industries



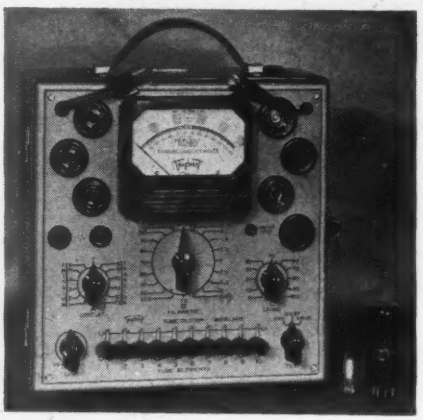
Overheating Protector

The Ashcroft thermal protector is an electric limit switch actuated by a thermocouple to protect equipment and materials against excessive temperatures. The limit temperature may be chosen with an accuracy of 2% in the available ranges of 100° F to 1000° F, or from 800° F to 2000° F. The protector will "fail safe" for the conditions of excessive temperature, burning or breaking of thermocouple, tube failure or power supply failure. **Manning, Maxwell & Moore, Bridgeport, Conn.**—Electronic Industries



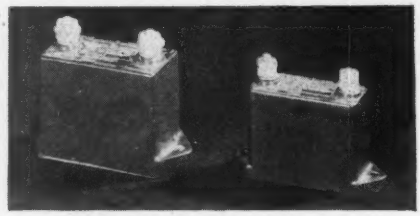
RF Voltmeter

An rf voltmeter, which measures directly the potential between the applicator electrodes of dielectric heating installations, consists of a coupler connected to the high voltage electrode, and an indicating unit. The indicator incorporates a small rectifier and a sensitive meter calibrated in two ranges from 0 to 5 and 0 to 25 kilovolts. The coupler is a voltage divider with built-in acorn tube for rf rectification. The instrument has a frequency range from 5 to 60 mc and is for operation on 115 volt, 60 cycle, ac. **Electronic Apparatus, Radio Corp. of America, Camden, N. J.**—Electronic Industries



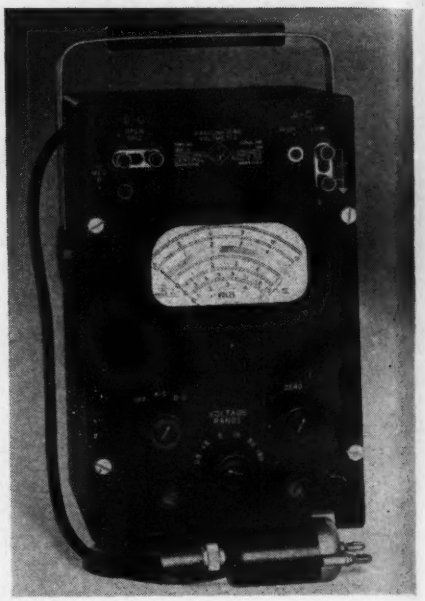
Tube Tester

Model 2425 tube tester reads transconductance directly by a simple measurement directly proportional to G_m of the tube. "Short" and "open" tests of every tube element as well as gas tests are provided for. There is no possibility for grid overloading. **The Triplett Electrical Instrument Co., Bluffton, Ohio.**—Electronic Industries



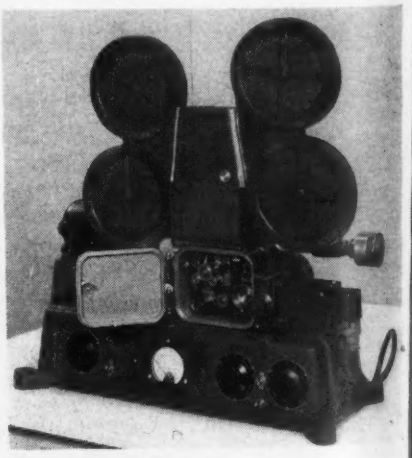
Plastic Cased Capacitors

Lectrofilm capacitors suitable for rf blocking and by-pass applications are now available in low-loss plastic cases. In case style 65 four ratings are listed from .0001 mfd at 3000 volts dc to .1 mfd at 500 v. dc. In case style 70 four ratings are available from .0001 mfd at 5000 v. to .1 mfd at 750 v. dc. **General Electric Co., Schenectady 5, N. Y.**—Electronic Industries



Vacuum Tube Voltmeter

Type 1800-A vacuum tube voltmeter, which supersedes Type 726-A, but is smaller and lighter, reads dc from .01 to 150 volts and ac from .1 to 150 volts. Frequency correction curves for resonance and transit time effects are supplied up to 500 mc. For relative voltage indication the instrument may be used up to 2500 mc. Zero setting is the same for all ranges. Input resistance for low frequencies is 25 megohms, for dc 10 megohms or open grid. Rated accuracy is ± 2%. The regulated power supply consumes 25 watts on 100 to 130 volts, 50 to 60 cycles, ac. **General Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass.**—Electronic Industries

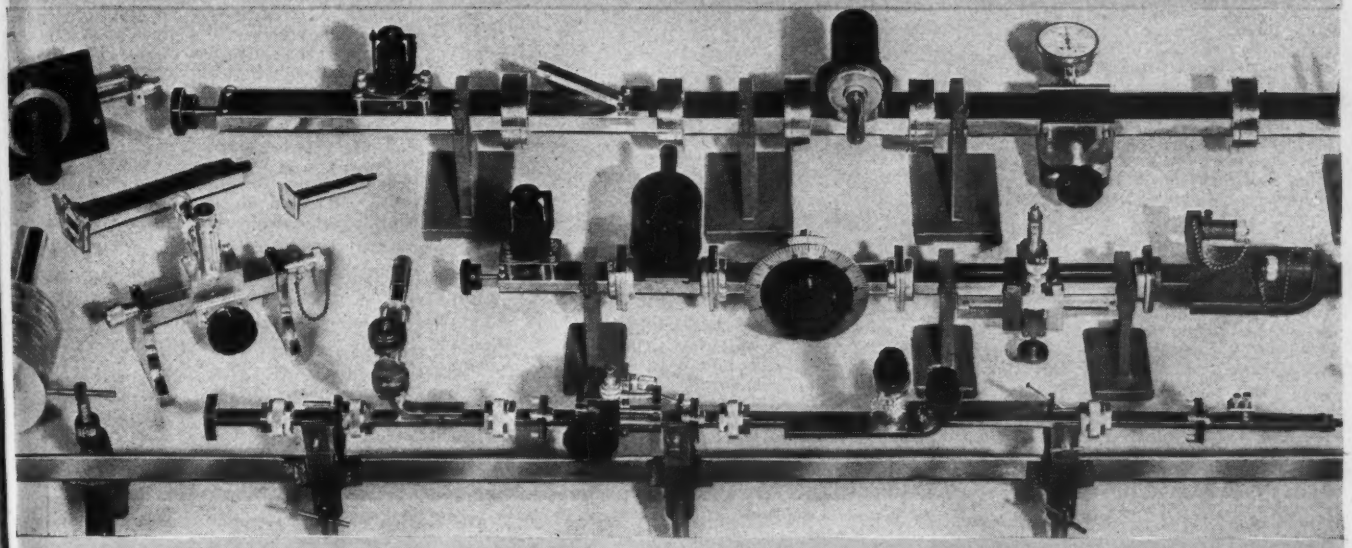


Sound Recorder

A sound-on-film recorder and reproducer utilizes standard motion picture film in 16, 35 or 50 mm sizes and permits printing of unlimited quantities of the master recording in a daylight printer, which is part of the equipment. Six separate sound tracks may be recorded on 16 mm film, the recording time being approx. 17 minutes on a 100 ft. roll. Audio frequencies up to 10,000 cycles can be recorded with the equipment, which weighs less than 100 lbs. **Electronic Chemical Eng. Co., 443 So. La Cienega, Los Angeles 36, Cal.**—Electronic Industries

DE MORNAY • BUDD
STANDARD TEST EQUIPMENT

For Precision Measurements in the Microwave Field



The complete line of De Mornay·Budd standard test equipment covers the frequency range from 4,000 mcs. to 27,000 mcs. It provides all R. F. waveguide units necessary for delicate, precision test work requiring extremely high accuracy in attenuation measurements, impedance measurements, impedance matching, calibration of directional couplers, VSWR frequency measurements, etc.

To eliminate guesswork, each item of this De Mornay·Budd test equipment is individually tested and, where necessary, calibrated, and each piece is tagged with its electrical characteristics. All test equipment is supplied with inner and outer surfaces gold plated unless otherwise specified.

NOTE: Write for complete catalog of De Mornay·Budd Standard Components and Standard Bench Test Equipment. Be sure to have a copy in your reference files. Write for it today.

The three test set-ups illustrated above include:

- Tube Mount
- Flap Attenuator
- Frequency Meter
- Calibrated Attenuator
- Tee
- Stub Tuner
- Tunable Dummy Load
- Standing Wave Detector
- Type "N" Standing Wave Detector
- Directional Coupler
- Hight Power Dummy Load
- Cut-Off Attenuator

Stands, etc.

DE MORNAY BUDD

EQUIPMENT FOR 97% OF ALL RADAR SETS

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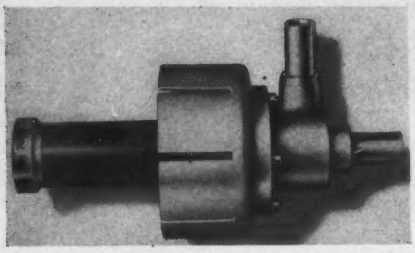
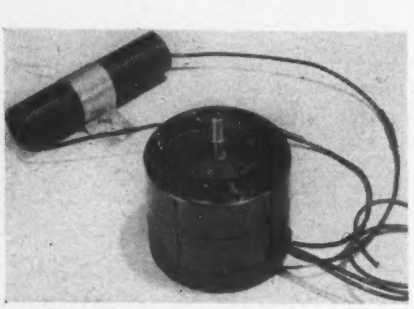


Water Cooled Resistor

For television, FM, and dielectric heating applications a liquid cooled, high frequency high power resistor is now being offered. Inside the type LP resistor a high velocity stream of water flows in a spiral path against the resistance film, the cooling action being adjustable by means of interchangeable intake nozzles to suit local water pressure and power dissipation up to 5 KW. The resistance film is less than .001 in. thick and has an active length less than one-quarter wavelength at fm and television frequencies. LP resistors are available in values of 35 to 1500 ohms with a standard tolerance of ±15%. The resistance elements are interchangeable. The unit may be mounted directly on the end of a coaxial line. **International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.**—Electronic Industries

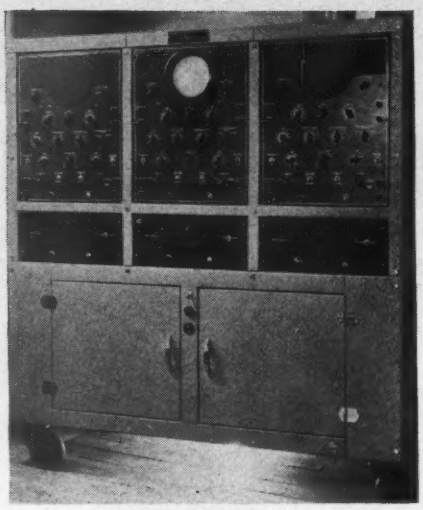
High Power Magnetron

A new magnetron furnishes 5 kw of continuous power output for use as cw oscillator operating on 1050 mc. The tube has a range of efficiency from 60 to 65% at max. power output and permits heating in a cavity or enclosure making it efficient for plastics and industrial heating applications. Cathode terminals and water connections may be turned in any direction. The anode is watercooled, the cathode a tungsten filament. **Electronics Dept., General Electric Co., Thompson Rd., Syracuse, N. Y.**—Electronic Industries



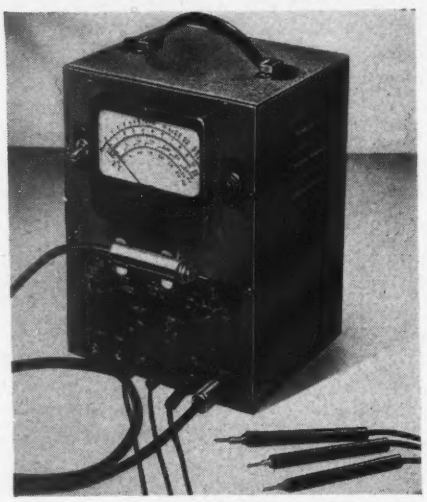
Synchronous Motor

A single-phase synchronous capacitor motor based on a new principle has been designed for use on record changers, wire and tape recorders, timers, etc. Weighing but 18 oz. the 3,600 rpm motor has a max. output of 2.4 watts, a starting torque of .75 oz. in., running torque of .9 oz. in. at 117 volts, and a low magnetic leakage field. The unit is for operation on 117 volt, 60 cycle, ac. **Fairchild Camera and Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.**—Electronic Industries



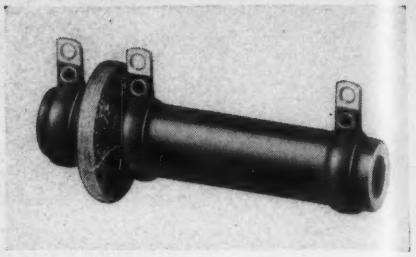
Three-channel Oscilloscope

To utilize their new triple-gun cathode ray tube (type 5Z3P11), three type 247 oscilloscopes have been assembled to permit simultaneous display of three phenomena on a single screen. Switching facilities provide for independent use of three vertical, three horizontal and three intensity modulation amplifiers, or any of these circuits may be connected in parallel if desired. All twelve deflection plates, as well as the three second anodes, are accessible for direct connection to signal sources. Characteristics of each channel are identical to those of the Dumont type 247 oscilloscope. The type E-3G47-S1 equipment is supplied with a General Radio 35 mm. oscilloscope camera for recording traces at speeds from 5 to 35 ft. /sec. **Electronic Tube Corp., 1200 E. Mermaid Ave., Chestnut Hill, Phila. 18, Pa.**—Electronic Industries



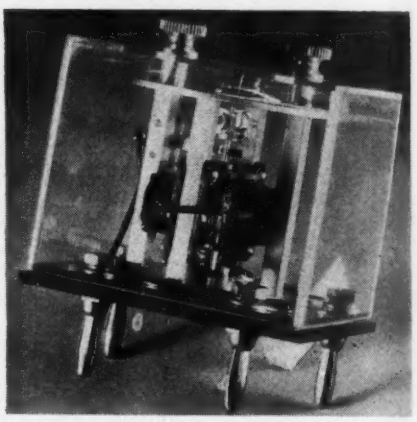
Electronic Circuit Tester

The first test instrument to use type 1247 proximity fuse type tube in a midget probe for signal tracing, the type 134 Polymeter provides an unusually wide range of electrical measurements for radio, FM, TV, and industrial electronic equipment operating on frequencies up to 300 mc. The instrument has a balanced amplifier circuit practically independent of line voltage and permits correct zero setting for all ranges by preset factory adjustments. Measurements include 0-1000 V. dc in 6 ranges, 0-300 V. ac in four ranges for af to 15 kc and for rf from 10 kc to 300 mc., 0-10 amps. current in 7 ranges, and 0-1000 megohms resistance in 6 ranges. The Polymeter is rated at 30 watts input at 105-125 volts, 50-60 cycles, ac. **Sylvania Electric Products, 500 Fifth Ave., New York 18, N. Y.**—Electronic Industries



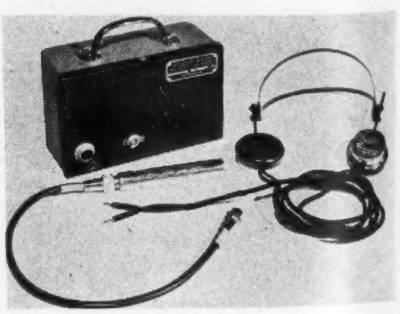
Video Coupler

A new television component, the videocoupler, has been designed to couple the video amplifier to the picture tube in television receivers. It is a three-terminal network, and combines three units in one assembly, including two peaking inductances and the load resistor. Convenient to use, it saves unnecessary procurement, handling, and variations incidental to the three individual parts it can replace. Accurate and consistent electrical characteristics are insured. **P. R. Mallory & Co., Inc., Mallory Bldg., Indianapolis, Ind.**—Electronic Industries



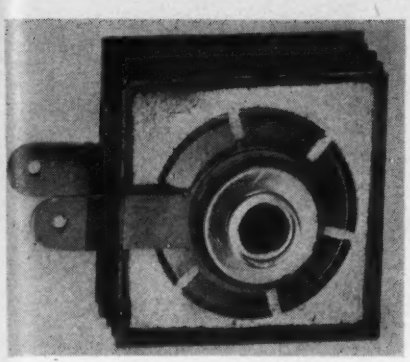
Frequency Selective Relay

A torsional type frequency selective relay for the control of a number of operations in variable sequence from a remote location has been designed to have high stability over a wide range of ambient temperature and pressure conditions. The oscillating member of the relay consists of a pair of astatically balanced magnets suspended on a main shaft. An arrangement series of torsional relays is available covering the frequency band of 10 to 20 cycles, the frequency being adjustable within the limits of ± ½ cps. Contact capacity of the relays is .05 amp. and max. contact voltage is 100. **Wallace & Tiernan, Inc., Belleville 9, N. J.**—Electronic Industries



Radioactivity Detector

For outdoor field service or for laboratory radioactivity studies model 5A radioactivity detector fills the need of a small, portable, lightweight instrument with self-contained batteries. The instrument proper, weighing 4¾ lbs, contains all auxiliary amplifying apparatus, and an oscillator to provide 1000 volts operating potential from miniature "B" bateries for the Geiger-Mueller counter tube. **Geophysical Instrument Co., Key Blvd. and Nash St., Arlington, Va.**—Electronic Industries

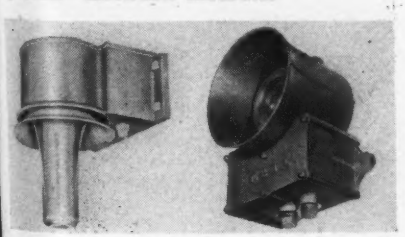


Selenium Rectifier

A miniature five plate selenium rectifier, the 5M1, has been designed to replace such rectifier tubes as 25Z5, 35Z5, 117Z6 and others in ac-dc battery portable radio receivers, console radios and vibrator power supplies. Radio equipment using this rectifier starts instantly, as no warmup time is required. Only one in. by one in. and occupying less than one cubic in. of space, the rectifier is to be used with 25 ohm series resistor and maximum capacitance of 40 mfd. Maximum continuous current is 100 milliamperes at an ambient temperature of 35 degrees C. **Radio Receptor Co., Inc., 251 West 19 St., N. Y. 11, N. Y.**—Electronic Industries

Appliance Temperature Tester

A new appliance temperature tester has been designed for use by appliance servicemen in the home, and for laboratory technicians and contractors. The unit checks operating temperatures of all types of refrigeration, and covers quick-freeze and deep-freeze temperatures as low as minus 100 degrees F. It also tests oven temperatures of gas and electric ranges. Four cold zones and two heat zones can be measured at one time by turning a switch to proper bulb and thermocouple positions. **J-B-T Instruments, Inc., 441 Chapel St., New Haven 8, Conn.**—Electronic Industries



Explosion Proof Speakers

Two new submergence and explosion proof loudspeakers, Model MSR and Model MM-2TC are available for extreme operating conditions of dust, spray, humidity, shock or under water service. Model MSR consists of a reflex air column horn, a radial deflector for 360° dispersion, and a hermetically sealed housing with a driver unit providing 15 watts output in the range from 250 to 6000 cycles. Model MM-2TC is a directional speaker consisting of a reflex air column horn and sealed housing with high capacity driver unit, having output characteristics similar to model MSR. **University Loudspeakers, 225 Varick St., New York 14.**—Electronic Industries

at ARNOLD **THERE IS**

NO CEILING ON QUALITY

We are not satisfied merely to offer you magnets which come up to the proposed R.M.A. standards . . . this is our minimum requirement. A quality floor below which we refuse to go.

Nor are we satisfied that ordinary production and inspection methods offer you adequate quality protection . . . we *individually test* each Arnold magnet in a loud speaker structure before shipment.

Another "individual touch" which has contributed to winning industry-wide customer acceptance for Arnold magnets is our established minimum standard of 4,500,000 BHmax for Alnico V material.

Over five million Arnold loud speaker magnets of the R.M.A. type have been produced since V-J Day under these quality safeguards. Continued adherence to them assures you of long-lived, dependable product performance.

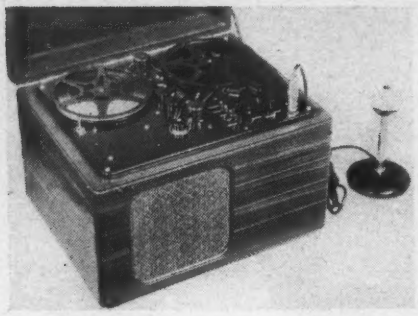
In the mass-production of magnets, the Arnold "individual touch" does make a difference. Let us give you the whole story.

THE ARNOLD ENGINEERING COMPANY

SUBSIDIARY OF ALLEGHENY LUDLUM STEEL CORPORATION

147 EAST ONTARIO STREET, CHICAGO 11, ILLINOIS

Specialists in the manufacture of ALNICO PERMANENT MAGNETS

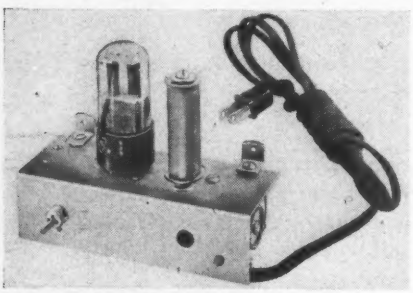


Magnetic Recorder

A magnetic recording-reproducing machine using a ¼ in. wide magnetic coated paper tape, complete with driving units, amplifier, speaker, and crystal microphone permits a recording time of 30 minutes on one reel. Frequency response of the unit is from 100 to 5,000 cps, signal-to-noise ratio approx. 40 db. The recordings are permanent. **Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio.**—Electronic Industries

Electronic Galvanometer

For the measurement of dc and low frequency ac voltage in the microvolt range a new contact modulated amplifier has been designed to replace suspension type galvanometers in circuits having between 5 and 100,000 ohms resistance. The equipment has a faster response than sensitive galvanometers, is not subject to vibration, and is suitable for actuating recorders, relays or dc motors. The amplifier uses a breaker to interrupt the input current, converts it to an 80 cycle ac voltage, and after amplification, rectifies the output synchronously. The unit is available for 6 volt battery operation or for 110 volts, 60 cycles, ac. **The Perkin-Elmer Corp., Glenbrook, Conn.**—Electronic Industries

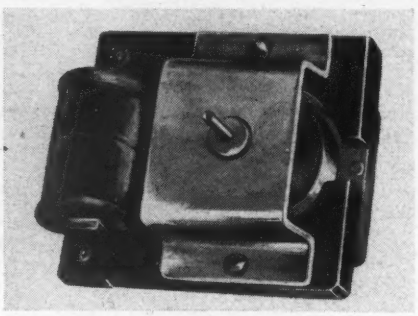


Phono Oscillator

Any record player or automatic record changer may be linked to a standard broadcast reeciver over a distance of 50 ft. by means of this phono oscillator which uses a 12SL7 tube. The unit is 2 in. wide, 5¼ in. long, and 4¼ in. high. The oscillator is permeability tuned to 600 kc, but may be adjusted anywhere in the range from 550 to 1550 kc. **D & M Mfg. Co., 51 Lincoln Ave., Midland Park, N. J.**—Electronic Industries

Waveform Analyzer

The synchroscope is designed for the visual examination of shape, amplitude, and duration of pulsed waveforms in television, pulse time modulation, sonic depth finders, geophysical exploration, etc. The instrument includes a 5 in. tube, a trigger generator for synchronization, and adjustable time delay phasing circuits. Space is provided for addition of a video amplifier and rf envelope viewer. Sweep speeds range from .01 to 5 in. per microsecond, and may be delayed up to 90 microseconds. Repetition frequencies from 500 to 5000 p.p.s. are provided. The instrument consumes 200 watts at 105-125 volts, 50-60 cycles, ac. **Electronics Div., Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18.**—Electronic Industries

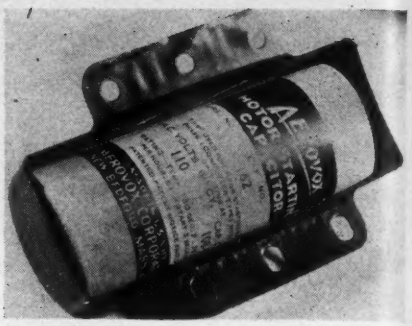


Miniature Motor

A miniature motor of the self-starting, permanent magnet type, can operate on as little as 30 milliwatts power in applications where a limited source of power is a factor. The dc motor will work in any position and is designed to start in only one direction, regardless of polarity reversal. To meet individual requirements the motors are manufactured with a number of bearing designs, and different field coil windings for operation on a variety of specific voltages. The illustrated model 2000-2 weighs 2¼ oz.—**Alni Corp., 10 E. 52 St., New York 22.**—Electronic Industries

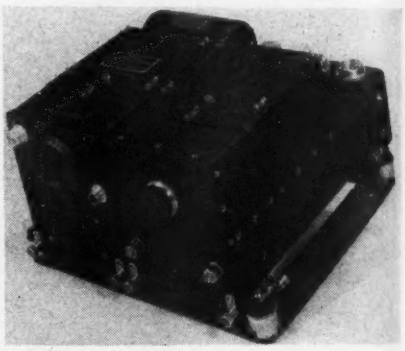
Foot Switch

Made especially for equipment requiring reliable control of power with complete freedom of the operator's hands, this foot-operated switch for series circuits is made of cast aluminum. Power handling capacity is 1000 watts at voltages up to 220 ac or 32 dc, non-inductive loads. Switch mechanism is snap action type, and can be supplied SPST or SPDT, either normally open or normally closed. **Electronic Controls, Inc., 44 Summer Ave., Newark, N. J.**—Electronic Industries



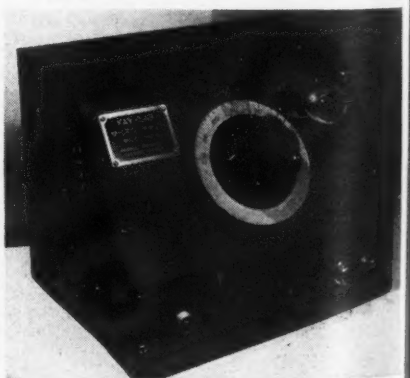
Capacitor Housing

A general utility housing for motor-starting capacitors accommodates the standard 1⅜ x 3¼ in. unit without any auxiliary caps or brackets. The housing, made of heavy-gage metal, completely covers and protects the capacitor and terminal assembly, and fits the motor frame contour. It provides a rugged, shock-proof installation. **Aerovox Corp., New Bedford, Mass.**—Electronic Industries



Range System

A tunable VHF receiver for operation on omnidirectional airways range systems is available for airline flight tests on the New York-Chicago omnidirectional range. The experimental receiver covers the range from 108 to 135 mc and includes a converter, indicating units, and other circuits necessary for flight operations and phase-comparison localizer installations. **Aircraft Radio Corp., Boonton, N. J.**—Electronic Industries



Wiring Capacity Meter

Model 401A Micro-Miker will measure shunt capacity in vacuum tube amplifiers directly without disconnecting the load resistor or disturbing the circuit. Input and output capacities of vacuum tubes and stray capacity between wiring and chassis also may be measured by direct substitution in a parallel resonant circuit at a frequency between 2.5 and 3.5 mc. The instrument consists of an rf oscillator coupled to a tuned detector with a tuning eye to indicate resonance. The capacity bridge provides a range from 0 to 230 mmfd on a semilogarithmic scale. Four tubes are used. **Kalbfell Labs., 1076 Morena Blvd., San Diego 10, Cal.**—Electronic Industries

The Collins 18S-1 Aircraft Transmitter-Receiver

Reliable Aircraft Communication for Commercial and Executive Planes

The Collins 180K-1 Antenna Loading Unit

Commercial airlines and owners of executive type planes have found that the Collins 18S-1 gives them the dependable long range communication they want. They are able to establish and maintain firm contact with ground stations, even under adverse conditions.

The 18S-1 delivers more than 100 watts of power on any of twenty crystal controlled frequencies. The receiver section, of superheterodyne design, also has twenty crystal controlled frequencies. Frequency range is 2.7-12.0 mc. After the equipment has been pretuned to desired channels, all frequency selection is automatic. Remote control is provided.

A single 1½ ATR unit cabinet contains the transmitter, receiver, and dynamotor power supply. The receiver operates directly from the 28 volt d-c power source. Weight, including shock-mount, is 60 pounds.

Other models:

The 18S-2 *includes CW facilities.*

The 18S-3 *includes CW facilities and has a frequency range of 2.7 to 18.0 megacycles.*

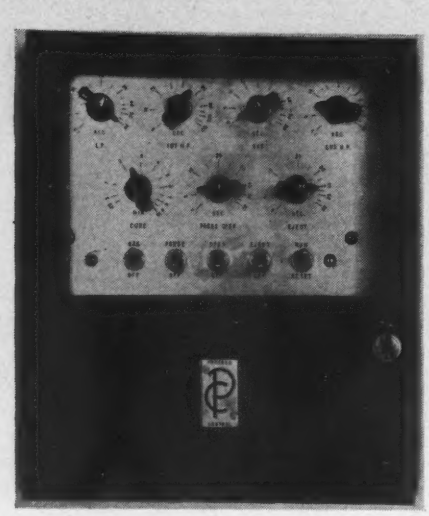
The 180K-1 antenna loading unit efficiently transfers the power output from an 18S to any standard commercial fixed antenna. Remote controlled, pretuned operation for ten channels is provided. Nominal input impedance is 50 ohms. Weight 12 pounds. Size 12" w, 7½" h, 10½" d.

IN RADIO COMMUNICATIONS, IT'S . . .

COLLINS

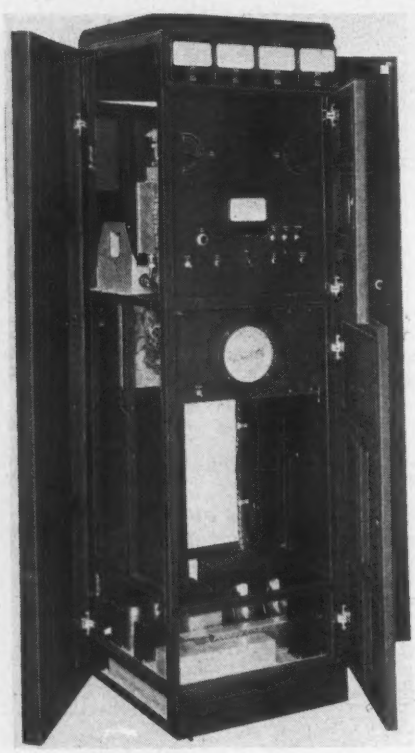
COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA

11 West 42nd Street, New York 18, N. Y. • **458 South Spring Street, Los Angeles 13, California**



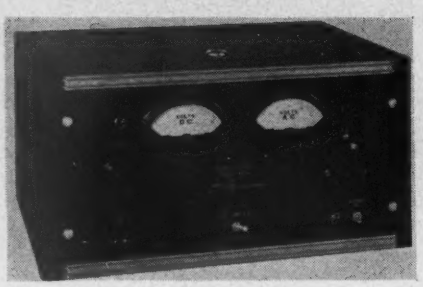
Time Cycle Controller

A general purpose time-sequence control unit can control up to seven separate process operations, the timing of each operation being indicated by a calibrated dial, which may be varied without affecting the timing or sequence of other operations. Time control is based on a specially developed, electronically actuated stepping switch which permits the setting of 18 cams in any one of 24 positions, manually without tools. The unit was originally developed for controlling the operations of compression molding presses. **Process Control Co., Inc., 2 East End Ave., New York 21, N. Y.**—Electronic Industries



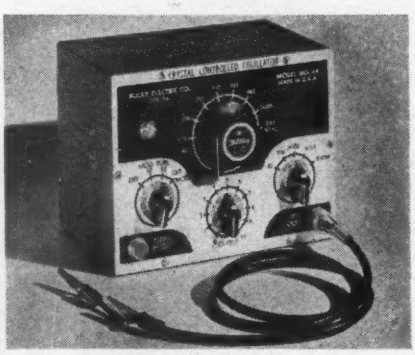
FM Transmitter

An output of 250 watts into the antenna over a frequency range of 30 to 44 mc is provided by the PFX-1A FM transmitter. The unit has facilities for local or remote control with as many as five station receivers installed within the transmitter cabinet. The receivers may also be locally or remotely controlled. For easy accessibility doors on all four sides of the transmitter rack may be opened fully. **Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago, Ill.**—Electronic Industries



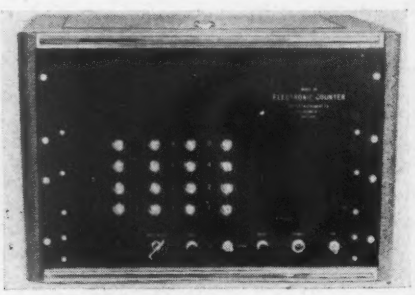
Power Supply

Electronically regulated power supply units, designed especially to serve as artificial dc power lines, where no dc power is available, are particularly suited for production tests of ac-dc radio receivers, sound amplifiers and similar electronic equipment. They are continuously adjustable between 0 and 135 volts at 0-450 milliamperes. The dc output voltage remains constant within 1% regardless of variations of ac power line voltage and load current. Units are housed in steel cabinets, and weigh approximately 125 lb. **Furst Electronics, 800 W. North Ave., Chicago 22, Ill.**—Electronic Industries



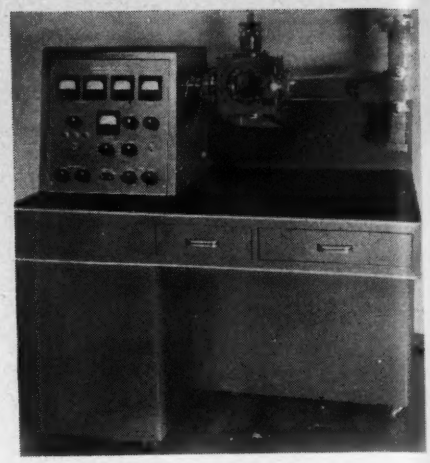
Test Oscillator

For greater accuracy in radio alignment this crystal controlled oscillator uses low temperature coefficient quartz crystals to provide direct control of five IF frequencies —175, 262, 370, 455 and 465 kc. Also crystal controlled are 200 kc for rf alignment and 1000 kc for short wave. A five step attenuator controls output from 0 to 15 volts. Power consumption is 17 watts at 110 volts ac or dc. **Bliley Electric Co., Erie, Pa.**—Electronic Industries



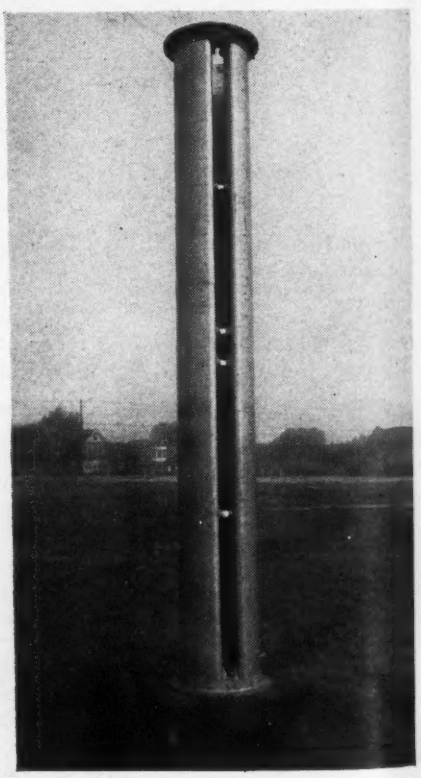
Scaling Circuit

Model 85 decimal scaling circuit is designed to respond to pulses occurring at rates as high as 100 kc per second and will aid determination of radiation intensity in conjunction with Geiger-Mueller detecting circuits. By means of four 4-tube decades of standard design it is possible to obtain scaling factors of 10 to 1, 100 to 1, 1000 to 1, or 10,000 to 1. The decades include input shaping circuits and power supply. Power consumption is 150 watts at 115 volts, 60 cycles, ac. **Potter Instrument Co., 136-56 Roosevelt Ave., Flushing, New York.**—Electronic Industries



Diffraction Instruments

Fifteen electron diffraction instruments will soon be available for the study of quartz crystals and metal surfaces in the oil, steel, chemical and other industries. The electrons produced by the "gun" of the instrument are accelerated by an electrostatic field of 40,000 volts and, after being magnetically focused, hit the specimen in a high-vacuum compartment and produce diffraction patterns on a photographic plate. Specimens weighing up to 40 lbs. may be examined. **Electronics Dept., General Electric Co., Syracuse, N. Y.**—Electronic Industries



FM Antenna

Designed to provide higher gain than any previous antenna, this cylindrical FM antenna is a single-element, mechanically-rigid, self-supporting structure. Without any arms, loops or circular elements, the new antenna is extremely simple to mount; the bottom flanges are bolted to the building. Known as the Pylon, it is a cylinder approximately 13 ft. high and 19 in. in diameter, with a narrow slot cut from top to bottom. The feed line is a single transmission line running inside the cylinder, along the slot. **RCA Victor Division, Radio Corp. of America, Camden, N. J.**—Electronic Industries

New Property Chart of ALSIMAG

TRADE MARK REGISTERED U.S. PATENT OFFICE

technical ceramic compositions SENT FREE ON REQUEST

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AlSiMag is the trade name of a large family of technical ceramic compositions. These compositions have different physical, electrical, mechanical and chemical characteristics. AlSiMag parts are custom made to specifications.

WHAT THE CHART TELLS:

The properties of the more frequently used AlSiMag compositions have been accurately determined and reproduced in chart form for quick reference.

ALSIMAG COMPOSITIONS NOT ON CHART:

Many special AlSiMag compositions have been developed to meet specific conditions. These are too numerous to chart. If chart indicates general characteristics of value, modifications to suit your special application may be available.

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Any designing engineer, production technician or purchasing agent will find chart helpful in his search for materials for unusual applications.

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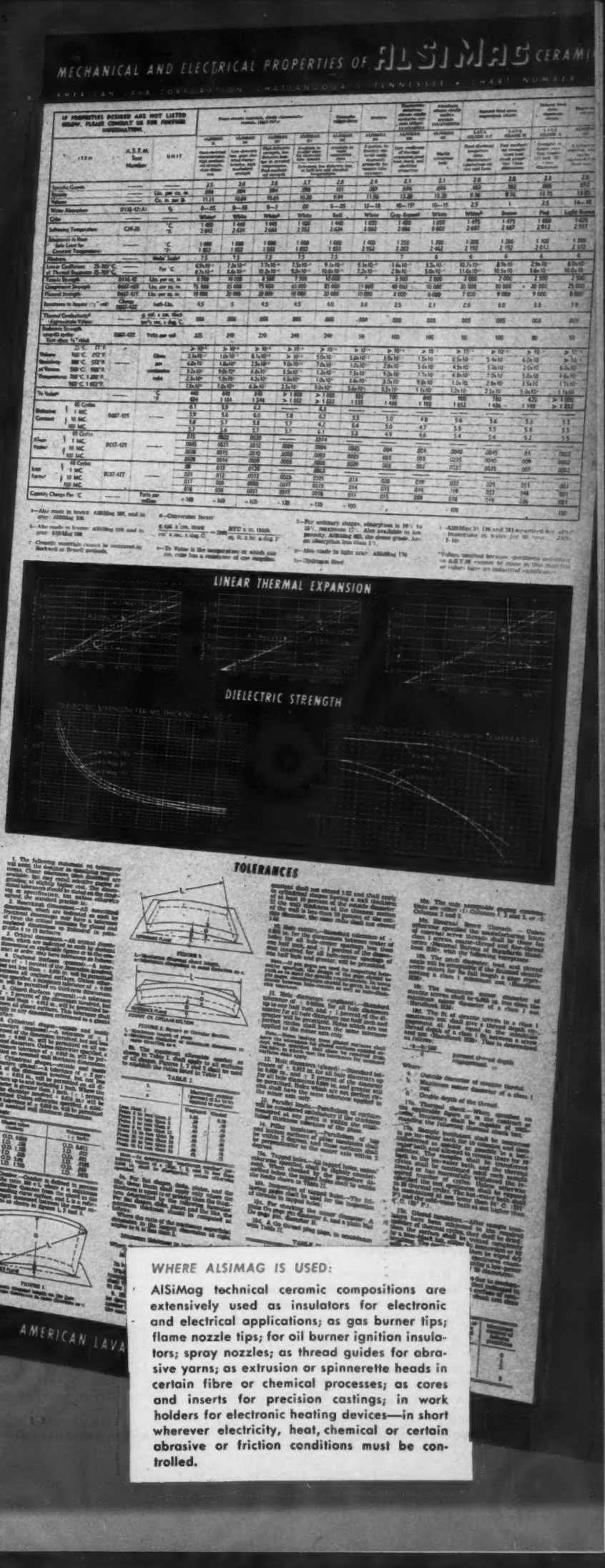
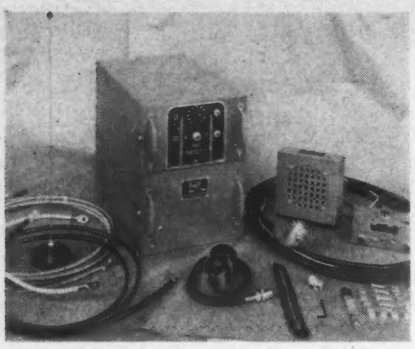
Printed one side only, folded to file size. For use under desk glass or as a wall chart or in standard file.



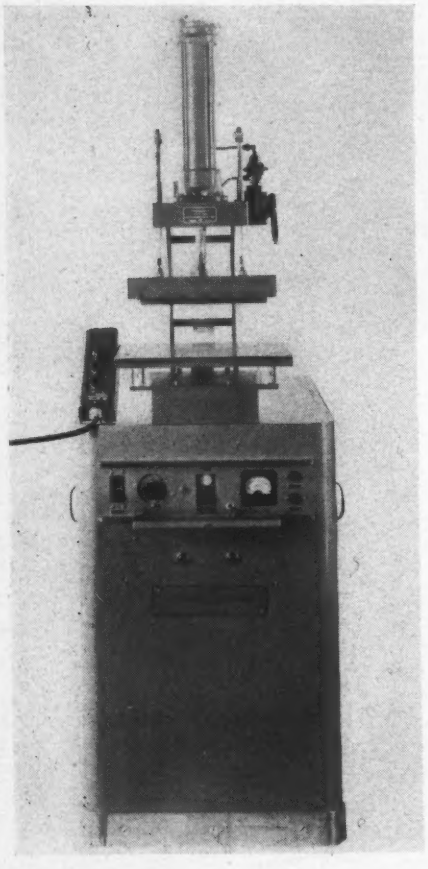
WHERE ALSIMAG IS USED:

AlSiMag technical ceramic compositions are extensively used as insulators for electronic and electrical applications; as gas burner tips; flame nozzle tips; for oil burner ignition insulators; spray nozzles; as thread guides for abrasive yarns; as extrusion or spinnerette heads in certain fibre or chemical processes; as cores and inserts for precision castings; in work holders for electronic heating devices—in short wherever electricity, heat, chemical or certain abrasive or friction conditions must be controlled.



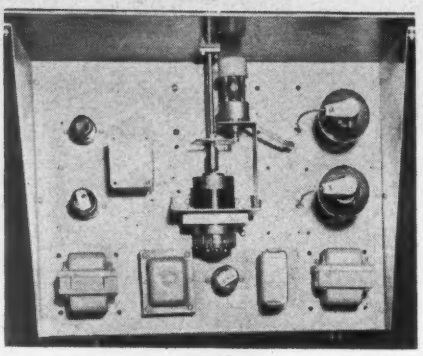
Mobile FM Equipment

Comco model 210, a mobile VHF transmitter-receiver for use in taxicabs, police, etc., operates in the 152-162 mc band and uses crystal controlled narrow swing FM. Transmitter and receiver are on the same chassis; the power supply, containing a 600-volt dynamotor, is separate. The receiver is a dual conversion, crystal controlled superheterodyne with 17 tubes with a stand-by drain of 3.8 amps. Either single channel or dual frequency operation is possible. The illustrated "Taxicab Package" contains all items necessary for complete installation. **Communications Co., 300 Greco Ave., P.O. drawer 6250, Coral Gables, Florida.**—Electronic Industries



Dielectric Sealer

Type K-3-S Thermatron 2½ kw dielectric sealer is suitable for sealing, welding or bonding thermoplastic sheets and has been especially designed for mounting type 4 sealing press on the unit and operating it by foot controls. The unit utilizes a frequency of 27.4 mc, provides a heat output of 8,550 BTU per hour, and is equipped with long-life, external anode tubes. It operates on 220 volts, 60 cycle, single phase, ac. **Thermatron Div., Radio Receptor Co., Inc., 251 West 19 St., New York 11.**—Electronic Industries



Follow-up System

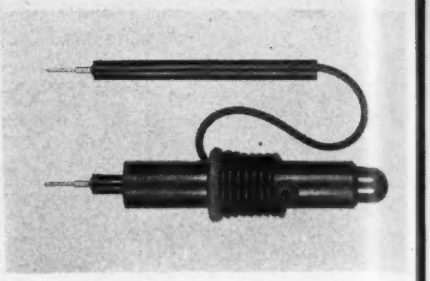
A new servo follow-up system has been developed for use where accuracy is desired in remote control, motor positioning, gaging of liquid levels and similar applications. The system has an output torque of 96 in.-ounces, and can be ordered for special uses in order to control up to ½ hp motors. Maximum following speed is approximately 50 rpm, and it has the high positioning accuracy of .027%. The system can also be used in reverse direction to control mechanical movement remotely in any application where a theoretical perfect long flexible shaft without backlash requiring inappreciable torque would be satisfactory. **Electronic Associates, Inc., 61 Brighton Ave., Long Branch, N. J.**—Electronic Industries

Amateur Receiver

The Collins 75A receiver has 14 tubes in a double conversion circuit with 1 rf and 3 IF stages to provide 2.5 watts output into 500 or 4 ohm loads with an rf input signal of 1 microvolt and a signal to noise ratio of 10 db. Straight line coverage of the 80, 40, 20, 15, 11 and 10 meter bands is obtained by a new system of permeability tuning. Image rejection is a minimum of 50 db; bandwidth is variable by use of crystal filter controls in five steps from 4 kc to 200 cycles at 6 db down. The receiver operates on 115 v., 50/60 cycles, ac. **Collins Radio Co., Cedar Rapids, Iowa.**—Electronic Industries

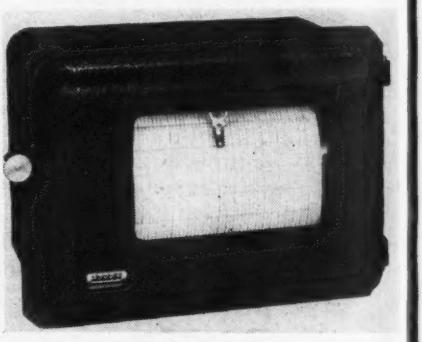
Resonant Relay

A resonant relay, which can be used for electronic applications without an auxiliary relay, has a vibrating reed mechanism adjusted to respond to a narrow band of frequencies (260-320 cps) and to reject all others. In electronic uses, the grid of a thyratron is triggered directly from the vibrating contacts of the resonant relay A small amount of energy received by the relay at its resonant frequency causes the contacts to vibrate. When the relay operates, the current from the power supply is delivered to the circuit to be controlled in pulses at the resonant frequency of the relay. **Stevens-Arnold Co., 22 Elkins St., South Boston, Mass.**—Electronic Industries



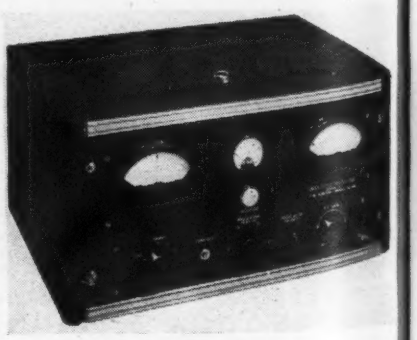
Test Lamp

A filament test lamp and voltage indicator is available in two models from 100 volts to 600 volts for use on ac or dc circuits to locate grounds, open circuits, blown fuses, etc. Variation in light glow indicates approximate voltage. The lamp is equipped with a number of safety provisions to eliminate shock and breakage hazards.—**Holub Industries, Inc., Sycamore, Ill.**—Electronic Industries



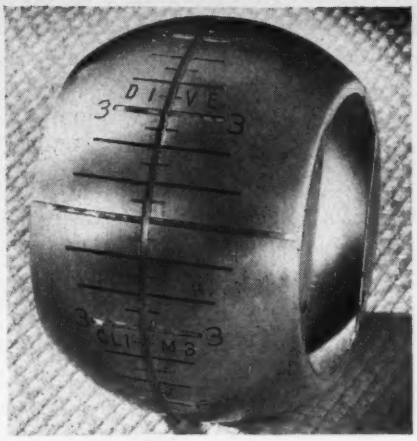
Process Operation Recorder

The number and length of operations and processes, such as the turning on and off of electric motors, electric furnaces, etc., may be determined with an operation recorder which will indicate and record up to 25 operations per minute. Operations may be recorded from 12 hours to seven days on renewable charts, the total number being totalized on an electric counter. The recorder will operate from any contacting device suitable for operation on low (6 V.) voltage. The device is especially useful to record processes and operations of industrial machines at a central location. **Instrument Laboratory Inc., 926-34 Elliot Ave. West, Seattle 99, Wash.**—Electronic Industries



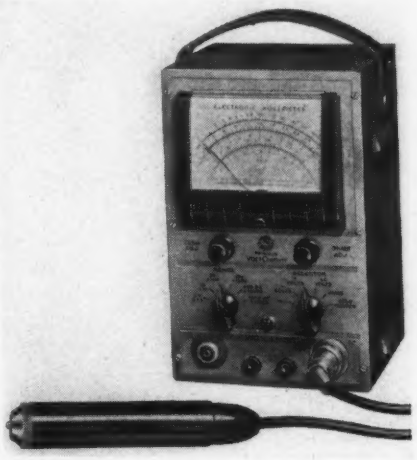
Frequency Monitor

A combination FM frequency deviation and modulation meter permits measurement of ±15 kc carrier frequency deviation and 20 kc modulation each side of center frequency on 1 to 4 channels in the 152 to 162 mc band. The instrument has an accuracy of ± .0015% with readings possible to .0003%. All crystals are temperature controlled, and each instrument is individually calibrated. **Doolittle Radio Inc., 7421 S. Loomis Blvd., Chicago, Ill.**—Electronic Industries



Dial Graduation

The Linotone process is a new method of precision engraving for the production of graduating dials or scales with an accuracy usually only possible with costly machine tools. Precision on circular dials is ±1 minute of arc at 3 in. of radius. In place of tools and dies a highly precise master is used, permitting great flexibility and even changes in design during production. Being particularly suitable for high quality-low volume work, the process is applicable to aluminum, brass, steel, and plastics without regard to the surface contour. Tolerance is less than 1/1000 in. in all dimensio. s. **Linotone Corp., Div. Mergenthaler Linotype Co., 536 W. 35th St., New York 1.**—Electronic Industries



Volt-Ohmmeter

The advanced model WV-75A of the VoltOhmist uses a special diode probe for measurement of peak-to-peak voltages up to 250 mc. The instrument comprises a vhf voltmeter, an audio, ac and dc voltmeter, ohmmeter and fm indicator. Ac and dc voltages may be read up to 1000 volts, resistance measurements may be made from 0 to 1,000 megohms in six ranges. A special protective electronic circuit prevents burning out the meter. **RCA Victor Div., Radio Corp. of America, Camden, N. J.**—Electronic Industries

Expanding Arbor

Certain machining processes may be speeded up through the use of this expanding arbor on secondary operations where work-piece is held by the inside diameter. Its design permits chucking and unchucking work-piece without stopping the spindle when used on a screw machine or lathe with standard collet. Since expansion is accurate, concentricity is maintained with the collet. Made in sizes from ⅜ in. to 1 in., at 1/64 in. intervals, an entire range is accommodated with three collet sizes. **Asco Corp., 874 East 140th St., Cleveland, O.**—Electronic Industries

(*Continued on page* 127)

Season's Greetings

from

CORWICO

We pause from the hectic business of delivering Wire ... to deliver a few words of sincere thanks to our friends for the splendid co-operation we have received from all hands in 1946. A really GOOD 1947 to all!

CORNISH WIRE CO., INC.

15 Park Row • New York City, 7

So clearly and unmistakably are draftsmen able to express their ideas on paper that their drawings have re-shaped the world. Through line, figure and symbol, draftsmen define the work to be done by the labor and machines of a nation. Assisting them to attain precision and clarity are drafting instruments that act almost as living extensions of their own hands...instruments that function figuratively as their partners in creating.

For 78 years Keuffel & Esser Co. drafting equipment and materials have been partners, in this sense, in shaping America, in making possible its swift-moving highway traffic, its speed in conducting business, its victorious might in war ...So universally is K & E equipment used, it is self-evident that every engineering project of any magnitude has materialized with the help of K & E. Could you wish any surer guidance than this in the selection of your own "drafting partners"?

You will find special advantages, for example, in PHOENIX* Tracing Cloth, which K & E has made almost "ghost-proof." Here is a cloth from which you can erase either pencil or ink lines without risking untidy "ghosts" on the prints, a cloth practically immune to stains from perspiration and water. You can even soak it in water for ten minutes at a time without harm! For further details about PHOENIX* Tracing Cloth, write on your letterhead to Keuffel & Esser Co., Hoboken, N. J.

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REMOTE AMPLIFIER

(*Continued from page* 71)

tode with feedback looped to the interstage cathode. As has always been true in the past, the writer found that a tube as a pentode with feedback does not give the quality that the same tube will as a triode with somewhat less feedback. It was also noted that the greater the applied feedback, the more critical the design of the transformer becomes.

After some investigating, it was found that the 6AK6 connected as a triode would easily give +17 dbm (50 milliwatts) output with 135 volts on the plate and a drain of 11 milliamperes. Using 6 to 8 db of feedback, the 1,000 cycle distortion at this point was only 1.0%.

After checking the output stage, the overall gain was further considered. In the input circuit, four T type faders in series parallel give a 6 db loss. The microphone transformer, having a 50,000 ohm output impedance, gives a voltage gain of 26 db when the secondary is unterminated as is customary in preamplifiers. This gives a net voltage gain of 20 db going into the preamplifier stage.

It was found that approximately 40 db gain is the maximum available from the 9001 tube if the plate load is to be held to 100,000 ohms maximum. The remaining voltage gain required (30 db) was found to be easily obtainable from the last two stages including the feedback circuit.

Battery power

The next problem considered was that of the battery power supply. The required voltages are 6.3 volts at 0.45 amperes and 135 volts at 12 milliamperes. After much consideration, the following conclusions were reached for the battery requirements:

(a) Dry batteries are the cheapest and easiest to handle for both filament and plate voltages.

(b) Dry batteries give the best life and performance as filament batteries if figured at a cell voltage of approximately 1.25 volts each.

(c) Five cells in series plus a small rheostat is the best choice for the filament supply.

The batteries chosen for the filament were the Burgess type 4F. This type is made by at least ten different manufacturers and is very low in price. The plate supply batteries chosen were Eveready

(*Continued on page* 101)

Photo courtesy Pacific Division Bendix Aviation Corp. North Hollywood, Calif. Transmitter-Receiver Unit for mobile communication equipment. Model LTR-1

QUALITY ELECTRICAL CONNECTORS IMPROVE OPERATION AND SELLING FEATURES OF ANY EQUIPMENT...

An axiom of the electrical equipment industry receiving greater and greater acceptance is *"No equipment is better than its electrical connections."* Cannon Electric has long taken pride in furnishing connectors for quality equipment. These vital parts are recognized by manufacturers as "musts"—such as the Collins and Bendix new equipment shown here. Many other prominent firms specify Cannon Plugs because *"Equipped with Cannon Plugs"* means quality connections.

Two-channel Transmitter, 17E-2. Specially designed for executive planes.

Photo courtesy Collins Radio, Cedar Rapids, Iowa.

* All the connectors shown in the transmitters are type "K." If you wish a bulletin covering these fittings, write Cannon Electric Development Co., Dept. L-122, 3209 Humboldt Street, Los Angeles 31, Calif. for Type "K" Bulletin, or contact our representatives located in principal cities of the U.S.A.

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For, in the course of designing and manufacturing over ¼ of a million different types of capacitors, our engineers have gathered a wealth of information, experience, or call it "know-how" that speeds the solution to every problem they handle. And the sooner your requirements are met . . . the more perfect the design — the greater are your savings. Typically, of the many problems C-D engineers have successfully licked are the capacitor types shown below.

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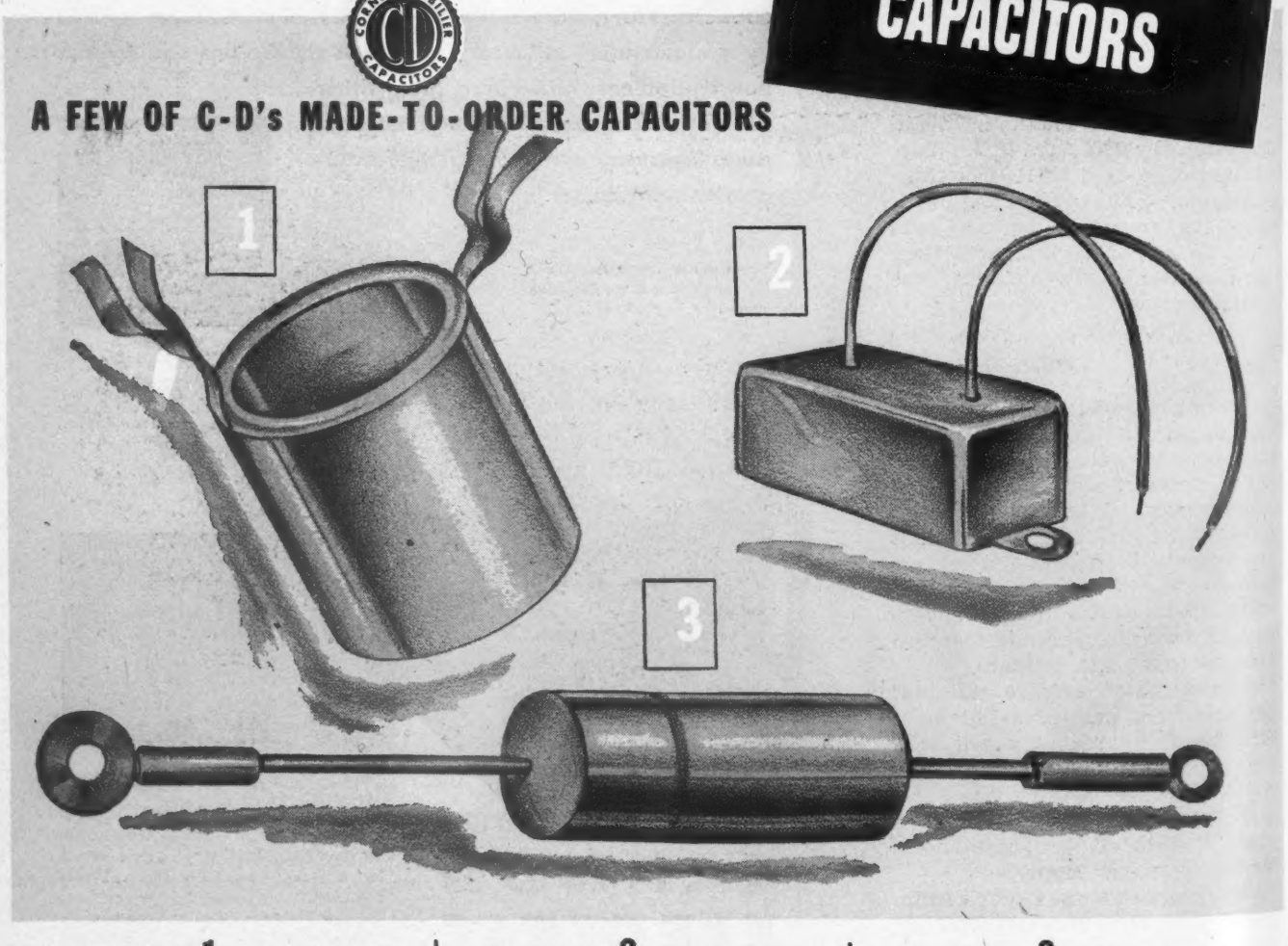


CAPACITOR #1. This capacitor unit was designed for a manufacturer of motors. Mounts directly on motor shaft.

CAPACITOR #2. Designed for spark suppressor applications in home appliance equipment. An inexpensive dependable unit for competitively priced mixers, juicers, grinders, etc.

CAPACITOR #3. Standard paper tubular capacitor adapted for automobile ammeter, oil pump, radio noise filter applications, etc.

type 482. This type is also made by many manufacturers and has high performance compared to its weight. Its price is low and it has a desirable space factor for this particular design. The life expectancy for the filament batteries is 50 to 55 hours and that of the plate batteries 100 to 125 hours.

The requirements for the ac operated power supply raised several problems. The power supply, in addition to being light and small, was required to operate within a few inches of a high gain preamplifier. This, of course, meant that very good hum shielding was necessary and also required that the ripple on the plate voltage had to be very low.

In order to avoid having more than one filament winding on the power transformer, the decision was made to use a cathode type rectifier tube with 6.3 volt filament. The choice of the rectifier tube to meet this requirement was between the 6X5, the 7Y4, and the 6ZY5-G. These are all 6.3 volt type tubes with well insulated cathodes. The 6ZY5-G tube has the lowest filament drain (0.3 amperes) but because it is a rather large tube, the 7Y4 was chosen. It has a filament drain of only 0.5 amperes.

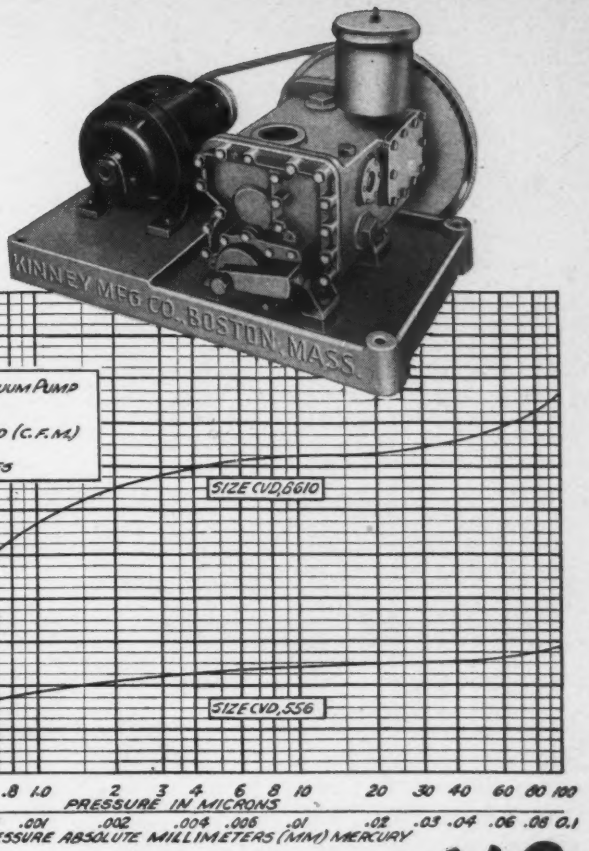
The power transformer, requiring only 15 watts of power, was housed in a mu-metal microphone transformer hum shield. This same type shield was used to shield the cutover relay which was ac operated for the sake of power supply economy.

The power supply in its final form weighed 3 lbs. complete and was designed as a plug-in unit. The plate voltage ripple is 100 db below the output voltage of 150 volts.

Switching arrangement

Provision is made in the output circuit for two remote lines and a telephone subset which is used for communication with the master control room. The output control switch provides switching the amplifier output from line No. 1 to line No. 2 in case of line trouble. The center switch position is provided for a cue circuit where only one remote line is used. In this position, only the line monitoring headphones is connected across the line. This means that there is no unnecessary loss of level of the cue signals at the amplifier end of the circuit. This is important, especially where the line loss is considerable.

(*Continued on page* 102)



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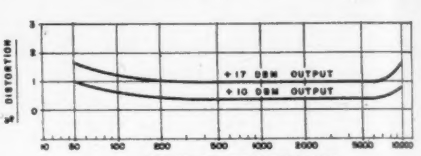
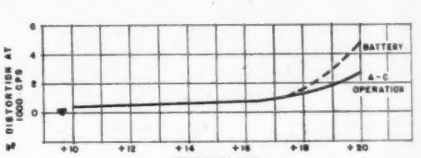
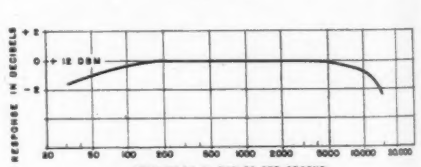
In order to prevent the amplifier being left on when the front cover is closed, a small interlock switch is provided to open the filament circuit. A 3 db isolation pad is provided in the output circuit to give improved line matching.

The VU meter is the illuminated Weston type 862 and has an on-off switch to economize on battery drain when needed. When the switch is in the off position and the amplifier on ac power, loss of meter illumination indicates loss of ac power. A meter selector switch is provided for checking filament and plate batteries.

The final performance characteristics obtained in the design of the remote amplifier are as follows.







Figs. 6, 7 and 8—Distortion and frequency response curves of the complete amplifier

The distortion and frequency response characteristics are shown in Figs. (6), (7) and (8).

Gain: 92 db.

Frequency response: ±1 db from 30 to 12,000 cps.

Output level: +17 dbm maximum (50 milliwatts).

Distortion: 1% or less at all frequencies with output level of +10 dbm or less.

Noise level: 60 db or more (unweighted) below program level with input level of —60 dbm.

Power consumption: 15 watts on a-c operation.

Battery life: Filament batteries 50 hours. Plate batteries 100 hours.

Weight: 40 lb. complete with batteries.

Size: 14½ in. wide, 11½ in. high and 8¼ in. deep.

Where ac operation alone is required, the batteries may be omitted, thereby reducing the weight to only 28 lb. All structural members of the amplifier are aluminum.

ELECTRONIC COLOR TV

(*Continued from page* 59)

stages in the timetable of laboratory demonstrations of electronic color television were outlined as follows: *Motion picture films* within 3 months; *Live-action studio scenes* by the middle of 1947; *Outdoor action scenes* by the latter part of 1947; *Large-screen theatre-size pictures* in 1948.

"RCA scientists and engineers have a complete plan for this schedule and our laboratory tests reveal that this is practicable," added Dr. Jolliffe. "We need only time to produce the necessary equipment such as cameras and tubes, so that a demonstration can be made in approximately one year, that will include all five stages at the same time, that is, the complete range of universal all-electronic color television—in motion, indoors and outdoors."

BROAD BEAM TUBE

(*Continued from page* 57)

tered in the envelope. The ends of these rods are held in four slots placed ninety degrees apart in the metal collars to which the helix is connected. The connection of the helix to each collar is made at the end of a narrow projecting finger which acts as an antenna in coupling the helix to the waveguide. Thus, the ends of the helix are fastened to the high voltage ends of two antennas.

Near the input end of the helix where the electron stream is shot in as a smooth unvarying flow, the signal level remains nearly constant for a short distance. In this region the signal acts on the electron stream, gradually producing fluctuations in velocity and density. Then, when these fluctuations become large enough, the electron stream begins to give up energy to the electric field, and finally there is a long region in which the signal increases the same number of db for each inch of travel.

Merit Expands

Considerable expansion has been started by the Merit Coil & Transformer Corp., Chicago, and will approximately double the present capacity of the plant. The company manufactures transformers for the electronic and electrical industries. Headquarters are at 4427 North Clark Street.

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It is the same with pickups. To achieve EAR-ACCEPTABILITY, all other factors must be satisfied. Of these, VIBRATORY-MOMENTUM is most important. The only way to test EAR-ACCEPTABILITY of a pickup is to put it to the EAR-TEST. The sharp, clean-cut *facsimile* performance of MICRODYNE—regardless of climatic conditions—is a marvel to all who know that EAR-ACCEPTABILITY is the final criterion.

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BETTERING OUTPUT

(*Continued from page 62*)

ing exhaust, the primary application of external bombardment causes an onrush of gas from the anode with consequent flashing or ionization. If precautions are not taken, blackened or smudged bulbs may result. Usual procedure is to apply the external bombardment slowly and to discontinue the application of rf energy during flashing. Subsequent bombardment of the anode to white heat 1000°-1200° C. is then possible with no bulb discoloration. Alternatively, Faraday shields may be used to prevent flashing or ionization.

The use of high velocity, large volume, air blowers is conventional to prevent sucked-in or collapsed bulbs. Wherever possible, it is preferred that carburization of thoriated tungsten be instituted before mounting the graphite anode; otherwise the anode will tend to adsorb the heavy hydrocarbon gases and lengthen the exhaust time.

Evidence exists that graphite anodes exert a gettering action and adsorb gases. Mantell[3] gives comprehensive data on the adsorbent qualities of carbon while Dunoyer[1] discusses the gettering action of charcoal at various temperatures. Life test data for graphite anode tubes show a definite improvement in emission which may be attributed to the clean-up action of the graphite. The utility of such gettering action is of value where extremely high, short-time peak loads are encountered.

Zirconium coating

Many power tube failures may be traced to emission troubles which result from poor vacuum in the tube. The use of zirconium-coated graphite anodes to maintain a high degree of vacuum increases the life expectancy of power tubes and greatly accelerates the exhaust processing. Zirconium is particularly well adapted for "clean-up" of an electronic tube because of its high adsorptive power, low vapor pressure, poor electron emission, and also because of the negligible electrical leakage values introduced.

Zirconium hydride may also be used for anode coating purposes since it is the same as gas-free zirconium, but with 1.5 to 2% of hydrogen added. This hydrogen is evolved when the temperature of the hydride reaches 300° C. and above.

Zirconium, properly processed for tube manufacture, is an adsorbent of large area, the adsorption varying with the surface condition. Zirconium powder mixed with a suitable binder is sprayed on the graphite anode and heated in vacuum to 1000° C. or above, at which temperature the zirconium adheres firmly to the anode, with the probable formation of zirconium carbide. The latter is a very hard, gray colored crystalline mass. The heat radiation from the surface is amost as high as from a perfect black body.

The binders most commonly used consist of a dilute solution of nitrocelluose in amyl acetate or of a silica sol—zirconium suspension developed by the Bell Telephone Laboratories.

Zirconium is highly reactive at elevated temperatures, combining readily with all but the rare gases, the optimum temperature range for gettering action by zirconium being 400°-600°. Properly processed zirconium will act as a continuous getter in a vacuum tube at temperatures of 200° C. and above. Zirconium coated graphite anodes, which are designed to operate between 500° C. and 600° C. are, therefore, very well suited for the optimum gettering properties of zirconium. Commercial tube production experience tends to corroborate the above data.

REFERENCES:

1. Dunoyer, L.—Vacuum Practice, G. Bell and Sons Ltd., 1926.
2. Hukagawa, S. and Nambo, J.—Adsorption Properties of Metallic Zirconium for Gases and Its Applications to Electron Tubes, ETJ Vol. 5, No. 2, February, 1941.
3. Mantell, C. L.—Industrial Carbon, 2nd Edition—D. Van Nostrand Co.—1946.
4. Marsden, C. P. Jr.—Thermionic Emission in Transmitting Tubes—Electronics December 1938.
5. Norton, F. J.and Marshall, A. L.—Trans. Am. Inst. Mining Met. Engrs., Inst. Metals Div., 156, 351 (1944).
6. Rogers, A. N.—Use of Zirconium in the Vacuum Tube—Preprint 88-19, The Electrochemical Society.
7. Spitzer, E. E.—The Application of Graphite as an Anode Material to High Vacuum Transmitting Tubes, Proc. I.R.E., August, 1933.
8. Spitzer, E. E.—Anode Materials for High Vacuum Tubes, Electrical Engineering, November, 1935.

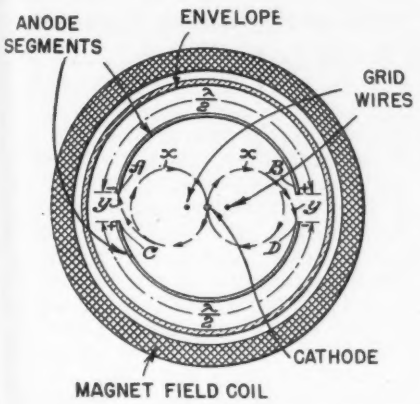
Aluminum Solder

The Aluminum Solder Corp., which will manufacture and distribute solder developed in Switzerland during the war, has been formed in New York and will headquarter in the Reeves International Building, 10 East 52nd Street. Head of the new company is Hazard E. Reeves.

PATENTS

(*Continued from page 78*)

Oscillations take place in the circumferential direction along the anode segments, one edge being positively charged at the instant the other edge is negatively charged, as indicated by the plus and minus signs in the drawing.



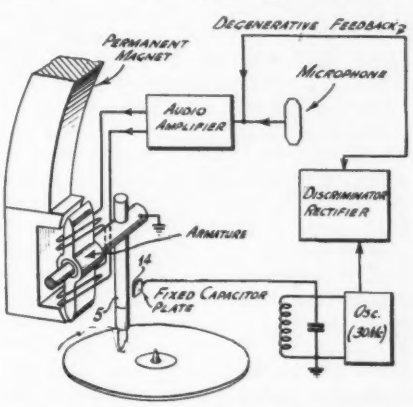
Negatively biased grid wires are arranged to prevent electron emission in certain directions. Interaction of the axial magnetic field, the grid wires, and anode potentials determines the electron paths which will follow the dashed lines x or y depending on the instantaneous potentials at the tips of the anode segments. The electrons will strike or come close to the instantaneously negative anode tips (A and D) when the adjacent tips (C and B) are at high positive potentials; however, the electrons will take paths x further away from tips A and D when tips C and B assume lower potentials. Electrons in no instance strike anode segment tips B or C. This explains how high frequency fluctuations in potential between adjacent capacitively-coupled anode tips influence the electron paths in such a manner that their action on the potential of the anode tips increases the initial potential fluctuations. The varying magnetic field generated by the changing current in the anode segments may also influence the electron paths.

Assuming the gap between the adjacent anode tips to be of the order of .25 cm, and a pulsed applied anode potential of 25,000 volts, the electrons will reach a velocity of 9×10^9 cm/sec and will traverse the region near the anode structure in approximately $1 \cdot 11 \times 10^{-10}$ sec; as this time interval should not exceed one-tenth of a cycle, the oscillation frequency may be 900 megacycles. Output may be obtained by electromagnetically coupling a loop or open-ended capacitors to one or both of the anode segments. The oscillator can also radiate energy directly and may for this purpose be mounted in front of a reflector.

An alternative to the grid wires is the coating of the cathode with electron-emissive material on opposite sides only. A further modification of the oscillator structure provides three or more evenly spaced anode segments of equal circumferential length. To prevent overheating and wear of anode segment tips A and D by impinging electrons, these tips may be made of a larger cross-section than the remaining portion of the anode segments.—C. W. Hansell, RCA, (F) July 25, 1941, (I) June 18, 1946. No. 2,402,397.

Negative Feedback Recorder

The capacitance variations between the grounded, moving stylus holder 5 and the fixed capacitor plate 14 control the resonant frequency of the tank circuit of the high frequency (for instance, 30 mc) oscillator; its output, upon discrimination, serves to provide negative feedback voltage for the driving audio amplifier. It is an advantage of this system that no coupling is present between the audio frequency driving coils and the high frequency feedback circuit so that shielding is not required. Similar results can be obtained by using a fixed-frequency oscillator



and shifting the discriminator characteristic by suitably inserting the varying capacitance in the discriminator circuit. Both effects may be combined to give double output voltage amplitudes by using two fixed capacitor plates in a balanced system where the oscillator frequency and the discriminator characteristic are changed in opposite directions in response to the displacements of the stylus. Various shapes and ways of arranging and mounting the fixed capacitor plate are suggested; it may, for instance, be secured to the permanent magnet if isolation is assured.—H. E. Roys, RCA, (F) September 13, 1943, (I) May 28, 1946, No. 2,400,953.

Television Receiver Screen

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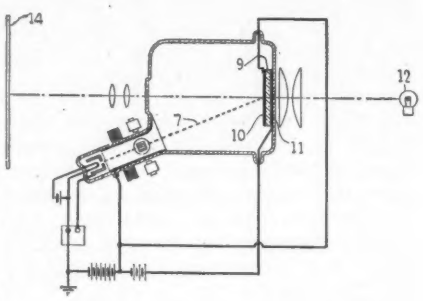
light are struck by a beam of cathode-rays, X-rays, or by light of suitable wavelength, a deposit of opaque material called opacity centers is created in the crystal, the degree of opacity depending on the intensity of the incident radiation. The opaque deposit can also be destroyed by the same type of rays, the degree of destruction in a given time interval depending on the intensity of the rays and on the density of the deposit already formed. Disappearance of the opaque deposit can be achieved, alternatively, by positioning the crystal in an electrical field at a suitable temperature, in which case the deposit moves across the crystal towards the positive pole where it disappears leaving the crystal substantially transparent.



A single flat crystal, a mosaic of small crystals, or a microcrystalline structure of this type substance may be used in the screen of a television receiver. Electron beam 7, which is intensity-modulated by the picture signal, scans screen 9, causing its opacity to assume values corresponding to the picture signal. The electric field strength between electrodes 10 and 11 as well as the screen temperature are adjusted to make the deposit move across the crystal at such a speed as to arrive at electrode 11 and disappear exactly after completion of one frame scanning period. It is then replaced by a new opacity center starting from electrode 10. Light source 12 will cause a picture to appear on screen 14.

The picture repetition frequency in this system can be much lower than with conventional reception methods, since the picture brillance is held constant during the complete frame scanning period and no flicker occurs. The minimum repetition frequency is determined only by the requirements of the eye to perceive continuous movement, and may be approximately 17 to 20 frames per second. Consequently, the frequency band width necessary to transmit the signal is less than in conventional systems.

Alternatively the opacity center may be removed by a different intensity electron beam or by an electromagnetic radiation of specified wavelength. The extinguishing spot is moved across the screen and is closely followed by the modulated spot which produces the opacity so that the opacity again persists throughout a complete frame scanning period.

A. H. Rosenthal, Scophony Corp. of America, (F) Sept. 21, 1943, (I) March 19, 1946, Re. 22,734.

Aircraft Landing System

It is proposed to combine on a cathode-ray tube screen indications derived from radio signals received on the plane and indications derived from gyroscopic apparatus installed in the plane, to inform the pilot of the position and orientation of the plane. For example, a three spot pattern may be produced on the screen similar to the image observed if three light sources are viewed which are located at the point where the plane is supposed to make contact with the ground and at two points located equal distances to the right and left, respectively, of one point on the aircraft approach path.

W. M. Hall, Research Corp., (F) December 10, 1938, (I) May 14, 1946, No. 2,400,232.

Largest Taxi Project Approved by FCC

The largest taxicab radiotelephone project yet to come before the FCC, the Yellow Cab Co.'s application for land stations at Los Angeles and San Francisco to communicate with a total of 1600 cabs, has been approved by the FCC. The experimental class 2 stations will use 152.27 mc, operating with 60 watts.

Ten other taxi companies in different sections of the country have recently obtained FCC approval of radiotelephone projects. They were: Greyhound Cab Co. (Baltimore); Yellow Cab Co. (National City, Cal.); Hickey Cab Co. (Bridgeport, Conn.); Libertyville, Ill. Cab Co.; Checker Cab Co. (Milwaukee); Lyndhurst, N. J. Cab Service; Yellow Cab and Checker Cos. (Albuquerque, N. M.); Valley Cottage, N. Y. Cab Co.; City Cab Co. (Falls City, Nebr.); and Yellow and Checker Co. (Flint, Mich.). Each company applied for one land and from three to 200 mobile units.

At the same time the commission granted the application of Dr. George Weems, practicing physician of Huntington, Md., for a land station and a mobile unit for his own use in furnishing medical service. The commission reports the grant is the first for an individual user of mobile service.

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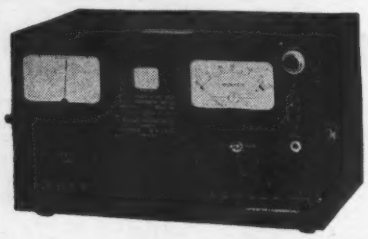

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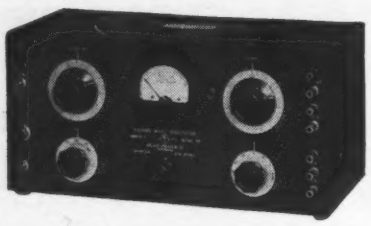

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Catalog on request

MEASUREMENTS CORPORATION
BOONTON NEW JERSEY

WIDE READING

(*Continued from page 77*)

amplitude A has its maximum possible value A_0

$$A_0 = v_1 \left(\frac{2n+1}{F_n}\right)^{1/2n}$$

which decreases from $2v_1$ at $n = 1$ to 1.44 v_1 at $n = 4$ and tends to v_1 as n tends to infinity. Variation of

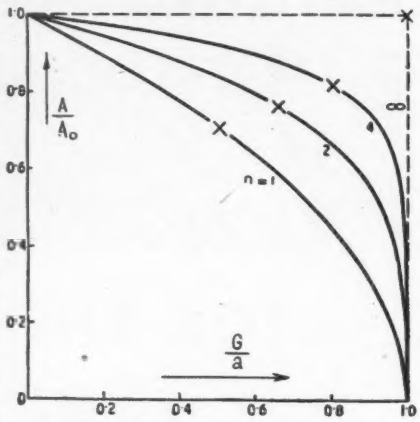

Fig. 3—Relative amplitude as function of load

the relative amplitude A/A_0 with load for $n = 1$, 2, 4 and infinity is illustrated in Fig. 3.

The power

$$P = \tfrac{1}{2} v_1^2 G \left[\frac{2n+1}{F_n} \cdot \frac{a-G}{a}\right]^{1/n}$$

dissipated in the circuit reaches a maximum value of

$$P_{max} = \tfrac{1}{2} v_1^2 a \cdot \frac{4n}{n+1} \left(\frac{n!^2}{2n!}\right)^{1/n}$$

when the circuit conductance G has its optimum value

$$G_{opt} = \frac{n}{n+1} \cdot a$$

The term following the multiplication dot in the expression for P_{max} varies very little with n: it is unity for n equal to 1 and n equal to infinity, and it reaches a maximum of 1.103 for n equal to six. Therefore, the maximum power available from the negative conductance, N, is approximately equal to that which would be expended in a conductance of value a by a sinusoidal oscillation of amplitude v_1.

If an external load, G_L, is connected to the oscillator it must be substituted for the intrinsic conductance, G, of the oscillator, while the negative conductance, a, may be changed to $a' = a - G$ to include the intrinsic conductance of the oscillating current. With these changes, the formulas for P, G_{opt} and P_{max} will describe the transfer of power to the external load G_L.

Fig. 4 illustrates the dependence of P/P_{max} on the ratio G_L/a' (load conductance G_L to negative conductance a minus oscillatory circuit conductance G) with four values of n as parameter. The curves dem-

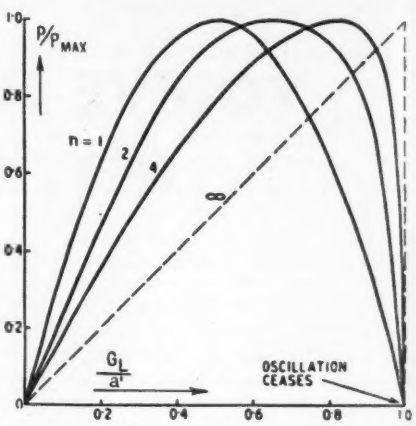

Fig. 4—Dependence of power output on load

onstrate the faster decline of power output with deviation of G_L/a' from its optimum values, $n/(n+1)$, compared with the behavior of a linear power source.

The response of the oscillator to a small external electromotive force of different frequency (shot noise, received signal in heterodyne operation, or side-bands in amplitude-modulated operation) is treated. Formulas for the amplitudes of the self-maintained and of the forced oscillations are evaluated.

MAGNETIC CONTROL

(*Continued from page 73*)

rent in L_3 bucks the field in L_4, causing an increase in the anode current of V_2. These unbalanced anode currents then cause a net output voltage to appear across R.

The circuit details are essentially those of providing an efficient field coil. The coil dimensions, dependent largely on the size of the tube itself, are those of a solenoid 3" long with an inner diameter of about 1 5/16". They are usually simple air-core coils, although soft-iron shields can be used over the coils for magnetic shielding. Such shields increase sensitivity about 50%. Though for a uniform field over the entire axial length of the cathode and anode, a coil of about 3" in length is required, shorter coils may be used to produce remote cut-off effects in the tube. The anode of the tube should be centered axially in the coil. When more than one control coil is used on a tube, the coils should be concentric.

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CONTROL UNIT

(*Continued from page 69*)

relatively simple because the consolette is practically complete in itself. Interconnections between consolette, power supply, microphones, and other external equipment should be made in conduit. Power circuits should be separated from audio circuits, and it is desirable to have the high level and low level audio circuits in individual conduits. The conduit can enter the consolette from either the rear or bottom of the cabinet.

Ease of maintenance is obtained by using a hinged top cover and hinged chassis. Opening the top cover gives access to plug-in capacitors, tubes, push-button switches, and relays. When the entire chassis is thrown back, most of the wiring is accessible. Also, in this position, the mixers and lever switches may be serviced. A rotary switch on the panel is provided for checking the condition of tubes. The VU meter is connected into the cathode bias circuits of the tubes for this test, and the reading obtained gives an indication of the tube condition.

The consolette weighs approximately 180 lbs., and may be placed on a standard desk. The power unit weighs 75 lbs. and is 17 in. high by 17 in. wide, by 8 in. deep.

The chief purpose of the consolette is for control of broadcast studios, but the equipment is flexible enough for other uses, such as in recording studios. In a large broadcast studio installation, a consolette can be used for each studio control booth, all units feeding into the master control equipment.

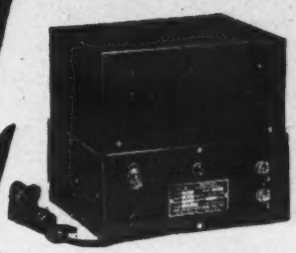
Press Wireless Moves Engineering

The Engineering Division of Press Wireless Mfg. Corp., a subsidiary of Press Wireless, Inc., is being moved from its present Long Island City, N. Y., location to the company's factory in Hicksville on Long Island. The move has been made to expedite production. The executive and sales offices will remain at 1475 Broadway, New York City.

Industrial Ovens

Industrial Oven Engineering Co., Cleveland, Ohio, has shortened its corporate style to Industrial Ovens, Inc. The company has recently occupied a new plant at 13825 Triskett Road. Industrial heating and processing equipment are the specialties of the organization.

New Models Available Now OF ATR QUALITY PRODUCTS



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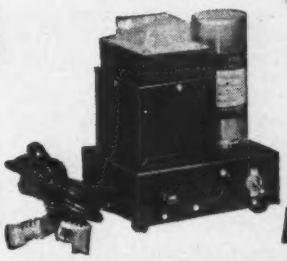

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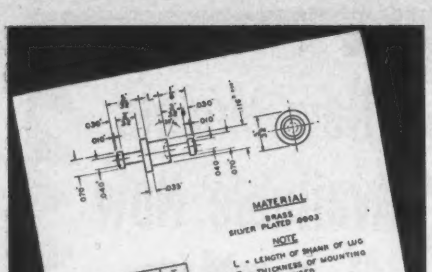
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ENGINEERS STUDY TV

(*Continued from page 64*)

combination including both standard broadcast and FM and a record changer, the viewing tube being a 10-in. semi-flat model.

Farnsworth also exhibited its tunable, rotatable dipole antenna which is electrically rotated by remote control so as to permit best signal pickup. Dipole arms may be lengthened or shortened for tuning purposes. A price of $62.50 has been put on the equipment.

General Electric exhibited several receivers including a large screen Schmidt projection model. In addition, there was revealed a new studio camera of unusually compact design, mounted on a pedestal which permits the camera to be raised and lowered hydraulically under the control of pedals. The camera has a four-lens turret and an optical viewfinder.

Sonora Radio and Television Corp. exhibited three receivers, one a console type with a 9-in. tube and the other two being table models, one having a 5-in. tube and the other a 9-in. tube.

Giving no hint of large-scale production soon to be inaugurated in its new two and a quarter million dollar plant, Philco exhibited no new receivers, the only model on view being a pre-war model equipped with a 14-in. direct view tube. Exhibitions for distributors, which will reveal a complete line of receivers, including table and console models, direct view and projection types, are scheduled for early Fall.

Network carriers

A glimpse of what may be television's future, when programs can be carried over coast-to-coast networks was furnished by the American Telephone & Telegraph Company's exhibit. Transmission of television programs over different types of facilities, such as radio relay, coaxial cable and telephone wires, were demonstrated. Programs were fed to the Bell System exhibit over a microwave channel across mid-town New York from the Long Distance building to the Waldorf-Astoria.

The coaxial program of the Bell System was illustrated by a large map, showing what has already been installed or is under construction, and what is planned for the next few years. These coaxial cables are installed primarily for urgently-needed telephone circuits. With special additional equipment, however, they can carry television programs.

The Bell System's first microwave radio relay system, to be completed in 1947, between New York and Boston, was illustrated at the exhibit by a diorama. An intermediate station, similar to the seven located on mountain tops along this route, was featured. Initially each of these stations, which are, on the average, about twenty-five miles apart, will be equipped for two-way transmission with complete spare facilities. A four thousand mc antenna of the type to be used along this microwave channel, was on view.

Two television monitoring receivers were in operation, fed over television transmission facilities furnished by the Bell System and so arranged that they could pick up programs from different broadcasters. In operation was the actual video amplifier used to feed the television programs to the receivers on display. This amplifier is the same type as those used at intervals of about one mile on ordinary telephone wires to make them suitable for carrying television images.

In addition to the Intra-Video System, Telicon engineers revealed push button television channel selector sets. A table model, the "Ten", featuring AM and FM radio in addition to offering 6 by 8 in. picture images will retail for approximately $425. The "Two Foot" projection Telicon, giving home movie size pictures will include AM and FM as well as an automatic record changer. It is custom built and will sell for $2,640. Prices for the "Fifteen", 15 in. tube receiver and the "Twenty", 20 in. tube receiver will be $1,450. and $2,100. respectively.

TBA's top engineering honor went to the three engineers who worked together to perfect RCA's Image-orthicon tube. Thus "for the outstanding technical contribution to television", the Award was given to Dr. Albert Rose, Dr. Harold Bell Law and Dr. Paul Kessler Weimer, all of RCA Laboratories, Princeton, N. J.

Rotom to Thermador

Thermador Electrical Mfg. Co., 5119 District Boulevard, Los Angeles, has taken over the Rotom Mfg. Co., Alhambra, California. The Rotom company has long manufactured fractional horsepower motors and will continue to do so in its Alhambra plant.

ELECTRONIC FORUM

(*Continued from page 47*)

are capable of handling transient wave forms. The convenience of precision single-excursion sweeps with a high ratio of operate restore time was mentioned. Accessory circuits such as lockout, sweep delay and timing circuits have been found to be essential for some purposes. Methods for designing a laboratory instrument capable of handling fast rising pulses as well as slower wave forms were discussed.

Applications of the Pressuregraph (an electronic instrument for indicating static or dynamic pressures in internal combustion engines, pumps or any device which is subject to pressure variations) were described by A. Crossley (Electro-Products Labs.). The use of a diaphragm producing a change in capacitance in a bridge circuit, causes modulation of a high frequency carrier. The modulated wave is amplified and visualized on an oscillograph. This system provides means whereby a static pressure calibration will suffice for both static and dynamic observations. The negligible inertia of the diaphragm permits true studies of transient pressures, such as met with in injection pumps, oil lines or other hydraulic or gas systems subject to unusually fast pressure variations.

Microwave relays

In a paper "A Microwave Relay Communication System" by G. G. Gerlach (RCA-Victor), the experimental results obtained with a 4000-mc relay system connecting New York and Philadelphia were described. This system has a frequency modulated subcarrier which in turn is used to frequency modulate the final carrier. Demodulation to the sub-carrier frequency is carried out at the relay stations. Similar microwave relay equipment will be installed by (Western Union) in a circuit connecting New York, Washington and Pittsburgh.

"Ignitron Converters for Induction Heating" by R. J. Ballard and J. L. Boyer (Westinghouse) described a new type of converter used with vacuum tube oscillator, particularly suited for heat treating, which makes it possible to supply this entire field of induction heating and melting with power from electronic equipment. A new circuit, is used, called the cycloinverter in which three phase, sixty cycle power is converted to single phase power at a higher frequency by means of a single conversion.

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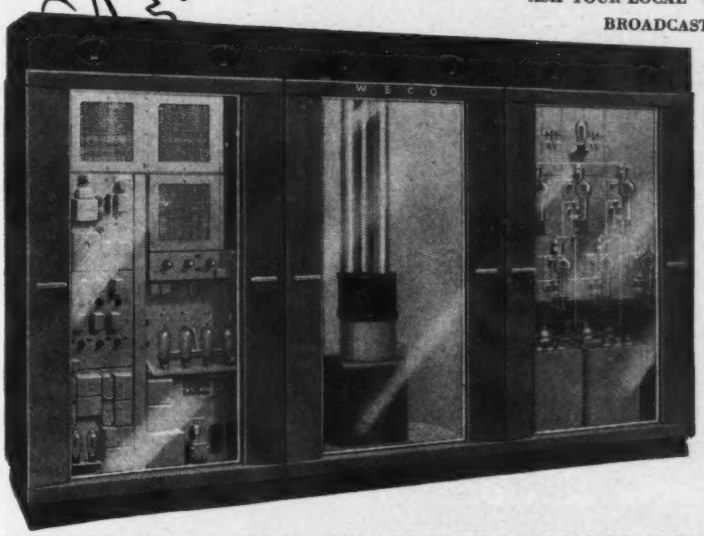

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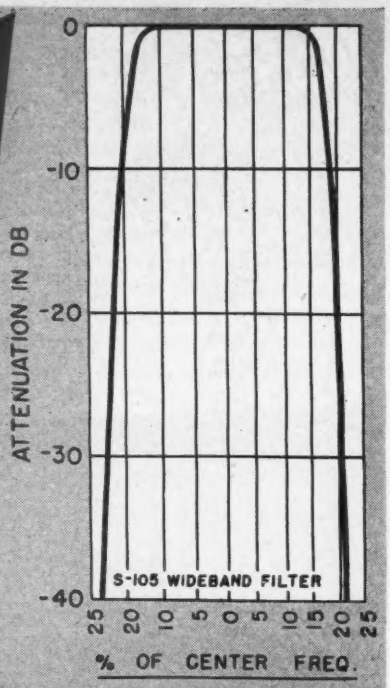

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PERSONNEL

Dr. Ladislaus Marton, known for his work in developing the electron microscope, has been appointed principal physicist in the electronics section of the National Bureau of Standards, Washington, D. C. Dr. Marton joins the bureau from the faculty of Stanford University, where he was associate professor of physics and head of the division of electron optics.

Dr. L. Marton

Dr. H. K. Skramstad

Dr. H. K. Skramstad has been appointed chief of the guided missiles section of the National Bureau of Standards, Washington, D. C. He joined the bureau in 1935 as a physicist in the aerodynamics section, and during the war worked on the development of the BAT, a radar-guided bomb.

Dr. B. J. Miller has been appointed chief of the recently organized guided missile electronics section of the National Bureau of Standards. The section is concerned with the electronic and servo-mechanism phases of guided missiles, research and development of which is the primary responsibility of the Bureau's guided missile section. As a physicist in the Ordnance Development Division of the Bureau, Dr. Miller played an active part in research phases of the radio proximity fuse.

Eugene Somoff has been appointed to the newly created post of technical service engineer at the American Standards Association, New York. During the war he served as a Russian translator for the Army, and was administrative assistant in the translation unit of the Air Service Command, Fairfield, O.

Joseph Collins has been appointed chief engineer of the Aerovox Corp., New Bedford, Mass. He was head of the electrolytic engineering division at Aerovox since 1938, and prior to that time was in charge of electrolytic engineering at Sprague Electric Co.

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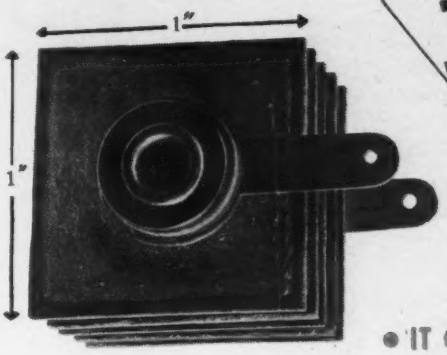

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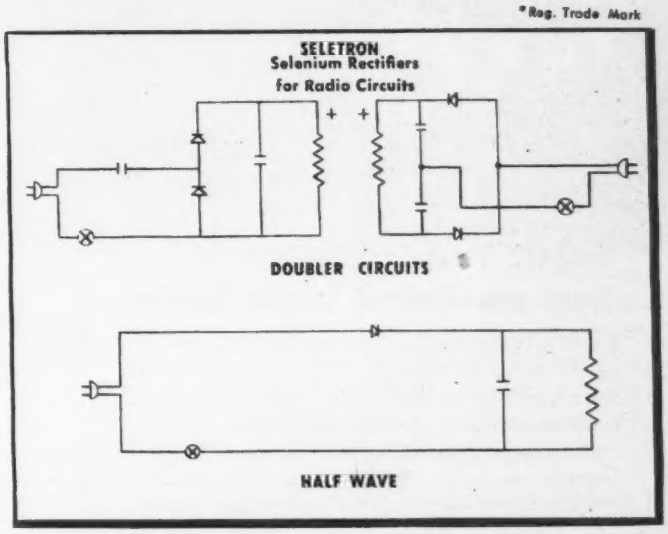

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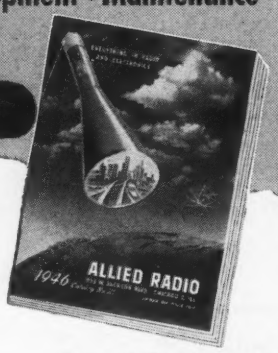

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Leslie G. Thomas has been elected vice-president in charge of manufacturing of the Solar Mfg. Corp., New York, and will supervise production at the company's plants in Chicago, Bayonne and North Bergen. Recently he was vice-president and works manager of the International Resistance Co., Philadelphia. **Don Corson,** former sales manager of the power division of Aerovox Corp., has been appointed manager of the special products division at Solar. Corson was also sales manager of the power factor division at Cornell-Dubilier Electric Corp.

Leslie G. Thomas

Don Corson

F. Ellis Johnson has been appointed head of educational activities at the Hanford Engineer Works, Richland, Washington. He was formerly dean of the colleges of engineering both at the University of Missouri and the University of Wisconsin. Hanford Engineer Works, organized by DuPont for the development of atomic energy, has been recently taken over by General Electric Co.

Milton Lauer has been appointed to the newly created post of product manager of the radio tube division, Sylvania Electric Products, Inc., Emporium, Pa. For one year during the war he served as chief of the production scheduling and distribution unit, electron tube section, radio and radar branch of the WPB in Washington.

Milton Lauer

Ray C. Bierman

Ray C. Bierman, formerly chief engineer with Permoflux Corp., has joined the staff of Webster-Chicago Corp., Chicago, as senior electrical engineer. Bierman was previously a broadcast engineer with NBC and ABC.

Dause L. Bibby has been promoted to manager of manufacturing, engineering and research at the Poughkeepsie, N. Y., plant of International Business Machines Corp. Previously he was executive assistant at the company's Endicott, N. Y., plant.

Paul K. Povlsen has been made assistant to the president of the Galvin Mfg. Corp., Chicago. He was formerly vice-president in charge of production and engineering for the J. I. Case Co., Racine, Wis.

Jerome R. Steen, formerly associated with General Electric Co., has been appointed director of quality control for the lamp, fixture, wire products, tungsten and chemicals, radio tube and electronic divisions of Sylvania Electric Products, Inc., Emporium, Pa. Joining Sylvania in 1931, he was appointed manager of the quality control engineering department, radio tube division, in 1944.

Jerome R. Steen

Samuel Lubin

Samuel Lubin has joined the field engineering department of Sprague Electric Co., North Adams, Mass., and will locate in Washington, D. C., where he will be in charge of contacts with all government agencies and laboratories including the Navy department, Signal and Air Corps, and the departments of the Interior, Commerce, and Agriculture. He was formerly with the new development section of the Technical Standards division of R.E.A.

Wells Davis has joined the staff of Battelle Institute, Columbus, O., where he will be engaged in electronics research. He was associated with the department of electrical engineering at Ohio State University for the past seven years, and prior to that was an engineer with GE.

Robert M. Bennett, Jr., has been appointed chief engineer of the St. Louis Microphone Co., St. Louis. While in the service, Bennett was stationed at the Radiation Laboratory of M.I.T., doing engineering work.

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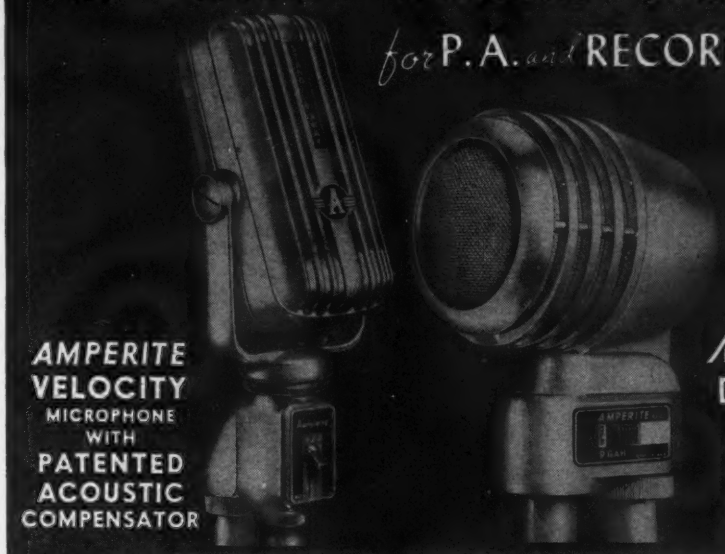

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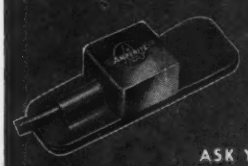

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Here is your chance to secure those hard-to-get tubes you need. STANDARD ARCTURUS places at your disposal a diversified supply of tubes of every type and description — both War Assets Administration surplus and regular stock. Every tube is subjected to rigid testing and servicing, including packaging.

The supply of some types is limited. To get the STANDARD ARCTURUS monthly announcements of available types of War Assets Administration surplus tubes, clip the coupon below and mail it *at once* with a complete list of your requirements.

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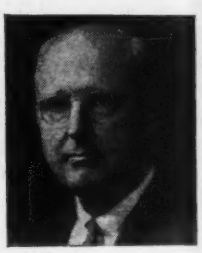
James L. Middlebrooks, who was appointed director of engineering of the National Association of Broadcasters in June, has been appointed chief facilities engineer for the American Broadcasting Co., New York.

Ben Adler, former chief facilities engineer at the American Broadcasting Co., has been elected vice-president in charge of engineering of the Transmitter Equipment Mfg. Co., Inc., New York. Adler holds patents on geophysical methods, a large screen television projection system and a synchronizing system, and in 1942 was appointed manager of test and measuring equipment section for RCA.

Ben Adler



Edwin Moran

Edwin Moran has been appointed to head the industrial and commercial activities of Honovia Chemical and Mfg. Co., Newark, N. J. He was formerly vice president of Sperti, Inc.

Alois W. Graf, chairman of the Chicago section of the Institute of Radio Engineers, has opened an office in Chicago for the practice of law in patent and trade-mark cases. Graf is a member of the executive committee of the Illinois Engineering Council, and is active in the Chicago Technical Societies Council.

Dr. Ralph Galbraith, contributing author of "Principles of Radar," has been appointed professor of electrical engineering and chairman of the department at Syracuse University, Syracuse, N. Y. Galbraith, who is a member of the A.I.E.E., will succeed Professor Charles Henderson, who has relinquished the chairmanship due to ill health.

Louis Gerard Pacent, president of Pacent Engineering Corp. and a well known consulting engineer, has been appointed a member of the Board of Examiners of the American Institute of Electrical Engineers. Pacent, who is a fellow of the A.I.E.E. and the I.R.E., will represent the radio engineering profession in his new capacity.

NEW BOOKS

Reference Data for Radio Engineers

2nd Edition. Published by Federal Telephone and Radio Corp., New York, 1946. $2.00, 336 pages.

The second edition of this reference book for research, development, production, operation, and education of electronic technics, brings up to date the chapters on microwaves through declassification of war developments, and presents much additional data along with all the material of the first edition. The manual has been compiled by the editorial staff of Electrical Communication, the technical Journal of the I.T.&T. The arrangement of the book remains unchanged.

General information, tables on "Engineering and Material Data" are followed by chapters on "Audio and Radio Design" and "Rectifiers and Filters." A chapter on "Iron-core Transformers and Reactors", describing power transformer design has been added. The theory of vacuum tubes and design methods for amplifiers are discussed in detail. Data on cathode ray tubes has been expanded.

A new chapter on room acoustics presents the more important considerations and tables on reverberation and required power levels for PA equipment. Wire transmission and rf transmission lines are treated in detail. The revised waveguide chapter includes equations for rectangular and cylindrical guides as well as illustrations of field distribution patterns. The material on radio propagation and radio noise has also been revised. Mathematical expressions and tables are given for antennas and arrays. Electronic integration and differentiation, relaxation oscillators, and Fouvier analysis of common wave forms are contained in a chapter on non-sinusoidal wave forms. Mathematical formulas and tables are included in the remaining chapters of the book.

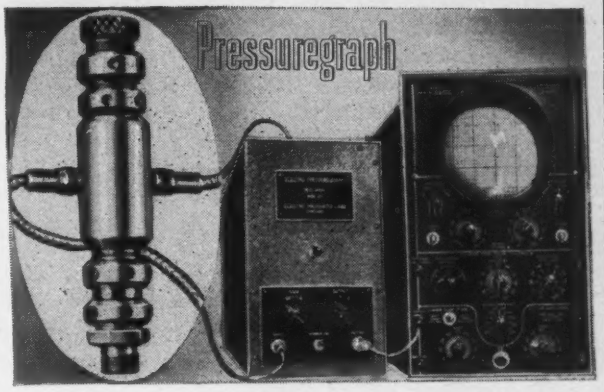
Heaviside's Electric Circuit Theory

By H. J. Josephs. Published 1946. Chemical Publishing Co. of N. Y. Inc., New York. 115 pages.

This monograph is based on an "Out-of-Hours" course of lectures delivered by the author at the Post

New! PRESSUREGRAPH

LINEAR PRESSURE — TIME — CURVE INDICATOR



Indicates in linear response, on screen of cathode ray oscillograph, the pressure - time - curve of any internal combustion engine, pump, airline, or other pressure system where pressure measurements are desired. Covers wide range of engine speeds and pressures up to 10,000 p.s.i. Screws into cylinder and can be calibrated using static pressures. Vibration-proof. Accurate, dependable for frequent engine tuning. SIMPLE OPERATION — ONLY ONE CONTROL.

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IF YOUR NEEDS in radio or electronics parts, sets or equipment are available

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Office Research Station in Great Britain. The scheme adopted is to base electrical circuit theory on a far reaching theorem reconstructed from scattered papers of Heaviside and called by the author "Heaviside's Last Theorem."

The introductory paragraph describes the breakdown of the classical method for finding the transient and steady-state solutions of involved circuits and indicates the advantages of Heaviside's scheme.

There follow chapters on the expansion theorem, ladder networks, Heaviside's last theorem, Carson's integral equations, the establishment of operational formulas and a discussion of transmission lines and the application of modern theories of integration to the solution of circuit problems. The book is tion.

Radio's Conquest of Space

By Donald McNichol. Published by Murray Hill Books, Inc. New York 16, N. Y. 1946. $4.00. 374 Pages with many photographs and sketches.

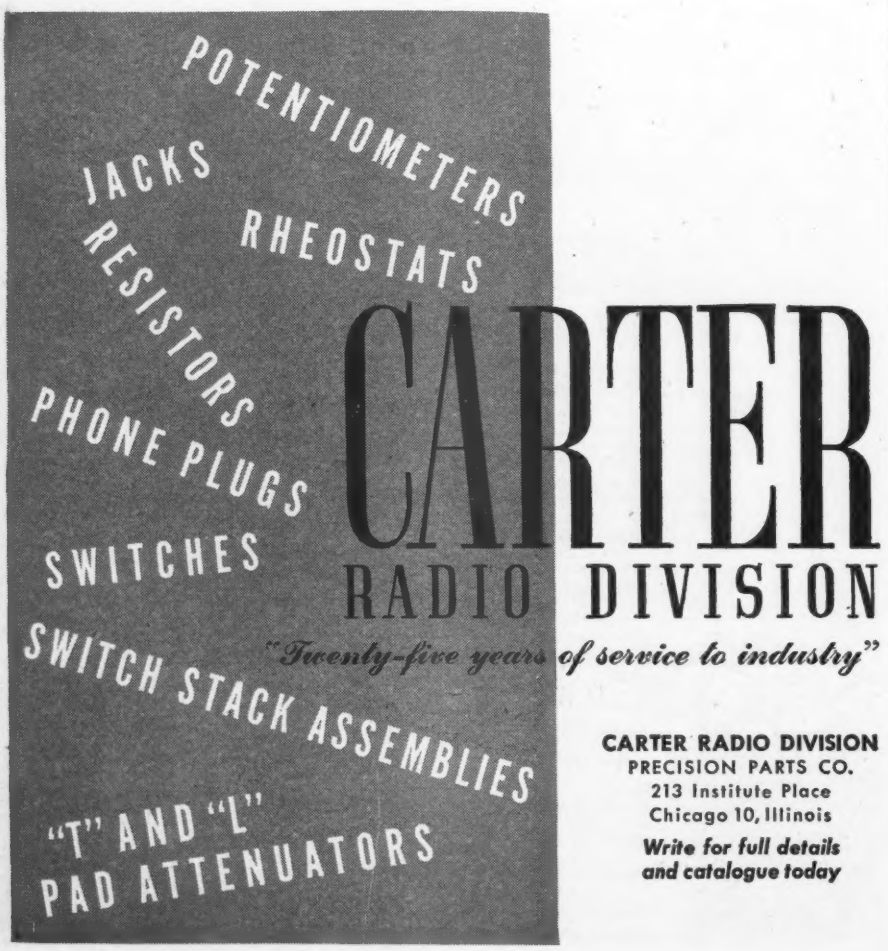
Although this pioneer radio engineer-historian disclaims any attempt to romanticize the history of radio, this "prosaic" record of achievement by the more than 500 experimenters, whose efforts have been identified by name, and of the hundreds of items that make up the science of radio, cannot help being more interesting than the ordinary romance. The author by his first hand contact with many of those whose contributions are listed, has assembled an authentic record of a fifty year active development period, following a couple of hundred years of more or less isolated events. He has used a style and approach to the subject that denotes good judgment in analyzing the development of items that had so many claimants for the "who done it" honors. The art is admirably covered, especially the earlier fundamentals, but even a few of the recent wartime developments are mentioned. While this book is not an engineering design treatise, its availability to numerous wartime research groups might have called attention to several earlier principles which, all but forgotten, were reinvented again. It is good reading for all—the old-timers who were in the game before 1941 and the newcomers who can thus easily get the background of this most interesting art.

Capacitors, Their Use in Electronic Circuits

By M. Brotherton, Bell Tel. Laboratories. Published by Van Nostrand Co. Inc., New York, N. Y. 1946. 107 + VI Pages. 32 Illustrations. $3.00.

Designers of electronic systems so often are concerned with the "important" components of a circuit that they disregard the routine items—such as the selection of the most suitable capacitor types. When it is recalled that such tactics have resulted in the general opinion among servicemen that capacitors should be checked first after circuits fail, it is refreshing to come upon this little manual written in such an interesting style, which shows that "defective capacitors are rarely traceable to limitations of the capacitor art per se. The responsibility usually lies with ignorance carelessness or an uneducated sense of economy".

Characteristics under steady dc and ac loads are described; followed by a review of the features of all common types. A final chapter on "Twenty Keys to the Right Capacitor" provides excellent reading for all designers.



NEWS OF INDUSTRY

(*Continued from page* 81)

quality amplifiers designed to take full advantage of the high fidelity characteristics inherent in FM. WBEN will broadcast on a frequency of 92.1 mc. At the present time, WBEN's plans are that no FM programs will be a duplication of the AM broadcasts.

WBNY, another pioneer of FM in Buffalo, expects to initiate FM service shortly after the first of the year. Station manager Albertson, anticipates an FM coverage of approximately 12,000 square miles. The FM transmitter is a General Electric 10 kw set feeding a 6 bay turnstyle antenna with a total elevation of about 2,000 ft. above sea level.

Wheelco in Indiana

In order to better serve Indiana, western Ohio and Kentucky territories, Wheelco Instruments Co., Chicago, has established a district service office in Indianapolis at 107 So. Capitol Ave. The office will be under the direction of John E. Anderson. The Indianapolis office will control a sub-office in the Temple Bar Building at Cincinnati. It will be under the direction of L. A. Wallingford.

Model 2450
ELECTRONIC TESTER

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There's never been a tester like this!

Here's a tester with dual voltage regulation of the power supply DC output (positive and negative), with line variation from 90 to 130 Volts. That means calibration that stays "on the nose"! That means *broader service* from a tester that looks as good as the vastly improved service it provides. This model includes our Hi-Precision Resistor which outmodes older types.

HIGHLIGHTS—42 ranges: DC and AC. Volts: 0-2.5-10-50-250-500-1000 • DC MILLIAMPS: 0-0.1-1.0-10-50-250-1000 • OHMS: 0-1000-10,000-100,000 • MEGOHMS: 0-1-10-100-1000 • CAPACITY IN MFD: 0-.005-.05-.5-5-50 • LOAD IMPEDANCE: 51 megohms on DC Volts • CIRCUIT LOADING: Low frequencies. Circuit loading equal to 8 megohms shunted by 35 mmfd. High frequency circuit loading equal to 8 megohms shunted by 5 mmfd.

Detailed catalog sheets on request.

Precision first ..to last

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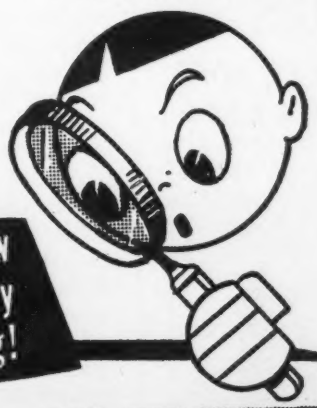

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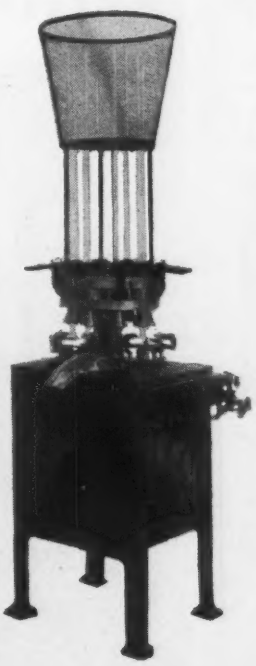

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Automatic throughout.

Can be synchronized with automatic Stem machine.

Accommodates eight full lengths of glass tubing.

Cuts off and flares in one operation.

Production 1250 flares per hour.

Made in two sizes: ***Miniature machine,*** for miniature flares and fluorescent starters, and ***Standard machine*** for standard size lamps, fluorescent and radio tubes.

Range of *Standard Machine:*

Glass tubing	35 to 42 gauge
Length of flares	5 mm to 80 mm
Forms flares up to	47 mm diameter
Net weight	1500 pounds
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Diathermy at 3,000 Mc

The FCC has concluded tests on a Raytheon diathermy machine which operates in the 3,000 megacycle band, and the Commission is working with Raytheon on the question of where to place such high frequency diathermy apparatus in the spectrum. Top FCC engineering officials stated that Raytheon was giving its whole-hearted cooperation on the experiments with the diathermy apparatus to avoid all possible interference to radar operations in that microwave band. In addition, the Navy is now testing the machine in relation to possible interference with radar installations and air navigation systems.

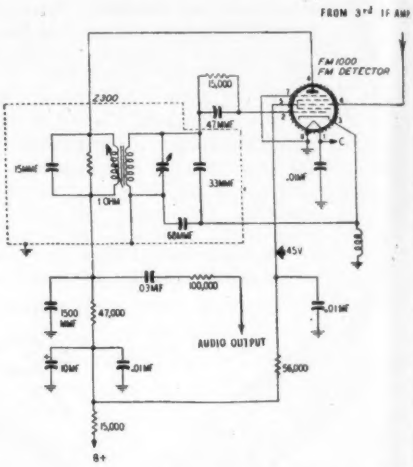
Minute Man Expands

Bernard Shereff and Jack H. Scheinmann have recently purchased all the stock of Minute Man Products, Inc., 309 East 22 St., New York 10, N. Y. The firm has been engaged almost exclusively in the production of chassis, brackets, and all metal parts for the radio manufacturing field, will expand their facilities.

Bradley Circuit Single Stage FM

A new single-stage FM detector developed by the Philco Laboratories represents the result of a research program to design a carrier wave detector highly responsive to carrier frequency deviation and insensitive to variations in carrier amplitude. The new Bradley circuit represents a more direct way of converting carrier frequency deviations into audio voltage than the conventional multi-stage discriminator limiter system. The practical application of the detector makes use of a new heptode tube designated as the Philco FM 1000 which embodies improved interlectrode shielding, high transconductance and sharp cutoff characteristics. The detector is also designed to have improved discrimination characteristics against unwanted carrier frequencies. Laboratory tests have shown that the Bradley circuit provides greater attenuation of unwanted signals than the conventional circuit. Compared with a discriminator system using a double limiter, the new detector has been shown to attenuate same channel interference twice as effectively and adjacent channel interference three times as effectively.

The essential portions of the circuit are the heptode and two resonant circuits mutually coupled and tuned to the intermediate frequency. One resonant circuit is connected in the plate lead and is coupled reactively to the second



Fundamental Bradley circuit as used by Philco in FM receivers has new heptode tube

resonant circuit so as to produce frequency modulation in accordance with variations in the plate current. The other resonant circuit is connected between one control grid (No. 1) and the cathode comprising an oscillator operating class C and producing short pulses of space current. The incoming signal is fed to the other control grid (No. 3) and varies the amplitude of the space current in accordance with the carrier frequency deviations. The net result is that the oscillator frequency tends to follow the carrier frequency and in fact approaches a constant phase relationship when the carrier frequency is steady. This phase difference corresponds to a particular steady state plate current. When the carrier frequency is changed, a new phase relationship between oscillator and carrier causes a corresponding linear change of mean plate current. The mean plate current, therefore, bears the desired linear relationship with the deviations of the incoming carrier frequency. [The plate resonant circuit is highly damped to prevent any carrier amplitude variations being coupled into the oscillator tuned circuit; this makes the detector insensitive to amplitude modulation.] The audio output is taken from the plate circuit through an RC combination.

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Ceramic, Porcelain & Steatite Insulators, Antennas, Hook-Up Wires, Shielded Microphone Cable and S. J. Cable.

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NEW BULLETINS

Transmitting Tube Manual

Whether it be lighthouse tubes, phasitrons, or standard transmitting tubes the Transmitting Tube Manual compiled by the Electronics Dept., General Electric Co., Schenectady, N. Y., will be a valuable aid to electronic engineers and designers in selecting the proper tube for a particular application. The compendium, supplied in a sturdy binder, is prepared in loose leaf form and arranged in sections with tabbed dividers for ease of adding new or revised data. A table of contents and a "Quick Selection Chart" aid in rapidly locating specific tube information. A separate application section includes definitions, classes of operation, typical applications, and notes on maintenance and operation. The main part of the manual gives technical information, descriptions, ratings, and curves on some 95 types of vacuum capacitors and switches, lighthouse triodes, phasitrons, triodes, beam power tubes, pentodes, mercury vapor and high vacuum rectifiers. Some of the more popular applications of each of these tubes are listed. The back of the manual contains an "Interchangeability Chart" for comparison with other tube types, as well as complete socket and base information.

FM Transmission Lines

Bulletin 42 containing complete technical information on FM transmission lines and the new 51.5 ohm coaxial lines for FM and TV is being distributed by Andrew Co., 363 E. 75 St., Chicago 19. Complete solderless installations are possible with these lines. The 16-pg. pamphlet contains charts of length- vs. efficiency for a variety of lines and diameters, as well as power ratings, attenuation data and constructional information. The back of the booklet describes dry air equipment and automatic dehydrators for use on coaxial lines.

Power Generators

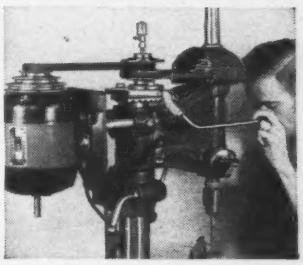
A 10 pg. booklet entitled "Generating AC Electric Power" describes generating plants, independent generators, high frequency generators, rotary converters, and dc battery chargers manufactured by Kato Engineering Co., Mankato, Minn. Technical descriptions, specifications, illustrations and prizes are included in the catalog.

Variable Speed Drive Attachment Offers Instant Speed Control for Drill Press Work!

Now you can adjust drill press speeds from high to low—or any intermediate speed—as easily as shifting gears in your car! The Era Variable Speed Drive Attachment enables the operator to provide the correct speed for large or small drills by merely moving a lever. This saving in time results in greater work volume, better work, and lower production cost. **The Era** Attachment fits all popular makes of drill presses, and is easily installed without the necessity of drilling holes or changing present equipment.

To also help save time on the job, many plant owners make chewing gum available to workers. Chewing gum seems to make work go easier, time go faster. Wrigley's Spearmint Gum may be used even when both hands are busy, eliminating work interruptions, and thus promoting greater safety for the operator.

You can get complete information from Era Meter Co. 3940 N. Kilpatrick Ave., Chicago 41; Ill.



Era Variable Speed Drive

AA-203

Sound Absorption

"K" Felt, a combination of kapok and other selected fibers designed for sound absorption and thermal insulation, is discussed in Data Sheet No. 3, which has been published by the American Felt Co., Glenville, Conn. This booklet explains fundamental principles of acoustic treatment, including formulas necessary for working out felt requirements, along with sample problems. Tables in this data sheet provide all necessary information for computing insulation requirements for any installation.

Precision Resistors

All types of vitreous enameled resistors are shown in the 8-pg. catalog 10-T, released by Model Engineering & Mfg., Inc., Huntington, Ind. Old parts numbers of the Tru-Ohm units, originally assigned by the Utah Radio Products Co., have been retained, and the listing has been simplified for easy location of any resistor and its full electrical and physical characteristics. Special non-inductive units and ferrule types are included. A complementary line of resistor mounting hardware also is shown.

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Crescent Speakers: standard P.M. 4"-5"-6" size.
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Development Specialists

Gerald N. Hanson, who has been engineering manager of the Sperry-Gyroscope Co.'s electronic products unit, has formed Hanson-Gorrill-Brian, Inc., to function as research, development and design specialists for products and special machinery. Associated with Hanson are W. Stanley Brian, inventor, who has seen service with such companies as General Motors, General Electric, Ken-Rad Tube and Lamp Corp., Grigsby Grunow Co., of which he was chief engineer, and the Arcturus Radio Co.; W. Sterling Gorrill, who was a research physicist for seven years with Sperry where he did outstanding work on servo-mechanisms, radar, computing devices, gyro stabilization, and infra-red detecting systems. The new organization will have headquarters at Meadow Lane in Glen Cove, N. Y.

Reporters Cover UN Opening Via Television

Press headquarters at the recent United Nations General Assembly in New York was outfitted with television receivers, to enable reporters who could not get accommodations in the assembly room to get a first hand view of the proceedings via television. RCA Victor division of the Radio Corp. of America supplied image orthicon cameras to pick up the action, RCA receivers were tuned to the sessions, and NBC cameramen operated the equipment.

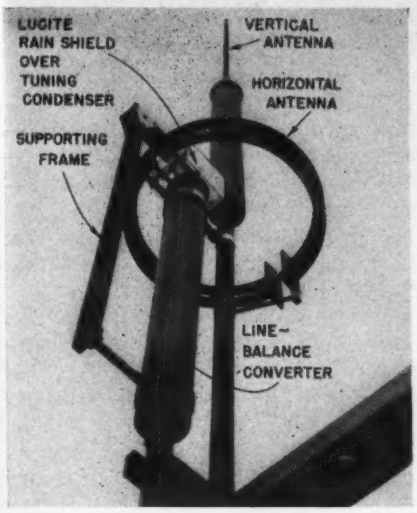
Newsmen made good use of a similar television service at the opening sessions of the UN Security Council at Hunter College, last spring. At that time, more than one half of the 700 reporters turned to RCA television for detailed coverage of the meetings. Many expressed a preference for this type of coverage, since it allows close ups of UN personalities.

Multicore Moves

Multicore Solder Corp. has occupied larger quarters at 315 Broadway, New York. The company distributes an resin multicore solder in wire form with three cores of non-corrosive flux. The solder is a British product made by Multicore Solders, Ltd., in England for whom the American company is exclusive sales representative.

PRESIDENT GALVIN AT MIKE

Paul V. Galvin, president and founder of the Galvin Mfg. Corp., makers of Motorola equipment initiating commercial radiotelephone service in the Chicago area. Motorola 152-162 mc frequency-modulated equipment with its 30-watt crystal-controlled mobile transmitter and companion crystal-controlled receiver together with a selective calling system are fitted in the trunk of the automobile. The central station transmitter of the Illinois Bell Telephone System's mobile service system is a Motorola 152-162 mc 250-watt central station transmitter unit.



Propose Circular Polarization for FM

An extensive series of tests on circular polarization was recently made by the United Broadcasting Co., owners of WHK, WHKB, WHKC, WHKK in the Cleveland area. As a result this group is recommending the adoption of circular polarization as the standard for FM and TV broadcasting stations. They point out that the propagation characteristics are quite similar to vertical and horizontal polarizations and in addition circularly polarized receiving antenna give the best results because they intercept all propagated energy, and automatically take care of changes from true vertical or horizontal polarizations. In addition radiations can be received on horizontal, vertical or inclined antennas.

Theatre Television

Technical equipment now being developed for theatre television will make it possible for theatres to become the amusement and cultural centers of every neighborhood, according to Ralph Austrian, president of the RKO Television Corp. Austrian made this prediction before a meeting of the Society of Motion Picture Engineers held recently.

Tele for Communication

"Television will the most powerful communication tool of them all," stated Charles R. Denny, Jr., acting chairman of the FCC, at a meeting of NAB's recent Chicago convention. Speaking for the commission, he stressed the communication aspects of television, and stated that video would not be simply a luxury entertainment service.

Stereoscopic Effect Coincidental Color TV

● While the recent color TV demonstrations may not have convinced a sufficient number of engineers that certain details of the systems presently proposed should be the final word, it did a remarkable job of focusing attention on the possibilities of a good system and on the public acceptance of the value and importance of color. The demonstration indicated further that delays in the development of a final set of color system standards can not be permitted by industry. Many developmental programs that had been lagging during recent years were enlarged thereafter and numerous other basic system possibilities are being studied.

One proposal of interest, made by Harry Lubcke, Director of Television for the Don Lee Television System in Hollywood is the basis for an intensive research program under a special color license grant by the FCC on a 35 mc band at a requested carrier frequency of 585 megacycles. Lubcke plans to combine stereoscopic (three-dimensional) images with color, moving thereby immediately to the problem which ultimately will need to be tackled by television engineers. He feels that an early review of this matter is important in view of the possibilities which exist for correlation and interleaving of standards requirements.

Initially, a simultaneous system using stationary filters rather than a sequential system, is contemplated. Registration difficulties are anticipated, although since the same waveforms can be used on multiple tubes only mechanical precision problems appear to be of consequence. Voltage variations and non-linearity affect each simultaneous channel equally and consequently have little or no discernible effect.

The stereoscopic effect will be provided without the use of special viewing spectacles or other appliances by the observer. Binaural sound, the stereophonic system, also will be provided and would be injected into the waveband between the portions used for video energy. Binaural sound has been found to provide remarkable improvements in making television realistic.

ATTENTION ENGINEERS, TECHNICIANS!

Save on Electronic & Communication Supplies!

Plate Transformer
6200 Volt CT-700 mils, 110V, 60 Cy. Tapped primary 2KVA. Freight charges prepaid to any part of continental USA. Special $39.95.

CW3 Receiver
CW3 Receiver (used for aircraft monitoring) a fixed freq. receiver (1100 KC to 16,500 KC) xtal controlled superhet with BFO and AC power supply; 110V, 60 cy. Coils can be furnished in any of the following groups: 1100-2100 KC; 3500-6100 KC; 5600-10,000 KC; 9400-16,500 KC; complete with add. set of tubes and one set of coils. $32.50 less xtal.

Full Wave Selenium Rectifier
Perfect for bias application—Use your DC relays from an AC source. Only requires 3"x½" mounting space Rectifier for input up to 300V @ 40 ma. output. $.89 or 5 for $4.00.

Miscellaneous
Type 803 ceramic socket suitable for both 803 & RK 28, etc., tubes—comes complete with rubber and aluminum 5" diameter shock mount. Very special $1.99
Socket for 204A, 849 ..... $1.95
Hour counter, counts up to 9999.9 hours. 110 Volts AC, 60 cy $4.95
9 conductor cable shielded with rubber outside covering ..... Per foot $0.12
Coax cable RG8U or RG11U. Per 100 ft. $7.50
Coax couplings for standard .405 cable silver plated chassis or cable $0.40
Coax right angle connectors, silver plated $0.90
Chassis feed thru female or both sides.... $0.79
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872A JAN tube..$3.50 866A JAN tube..$1.39

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13 E. 40TH STREET NEW YORK CITY CABLE ARLAB

FCC Approves Five Mobile Projects

Four mobile telephone projects of three Bell System companies and one independent company have been approved by the FCC. One was the Texas highway mobile telephone system of the Southwestern Bell which comprises 16 land stations, the same number of auxiliary test stations, and 325 mobile units. The Illinois Bell received sanction of an additional link in the Chicago-St. Louis highway mobile system with land and test stations at Champaign and Rockford, Ill., with 400 mobile units. Indiana Bell was granted one land and one auxiliary and 25 mobile units. The Upstate Telephone Corp. of New York received approval for two land stations at Mohawk and Johnston, N. Y., and 20 mobile units.

Carter Enlarges

Carter Motor Co., long a manufacturer of dynamotors and other types of rotary converters has relocated in its own building at 2644 N. Maplewood Avenue, Chicago. The new building provides more than four times the previous floor area.

G-E Scientist Honored

Victor H. Fraenckel, scientist at the General Electric Research Laboratory, was awarded the medal of freedom, a special civilian award of the War Department. According to the citation, Fraenckel served as special adviser on radio and radar counter-measures under the Commanding General, U. S. Strategic Air Forces in Europe. "He formulated many of the operational policies and technics which greatly contributed to the effectiveness of the radio counter-measures program in our strategic air effort."

Contact Arms

Under license arrangement with the Western Electric Co., the D. E. Makepeace Co., Attleboro, Mass., has undertaken the manufacture of bar contact tape. The company plans to supply the tape alone, to attach the tape to arms supplied by other manufacturers, or to provide complete assemblies of arms with tape attached. Tapes are supplied in various metals and as bimetallic forms in which precious metals may be combined with palladium and palladium alloys on nickel.

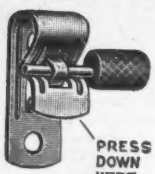
Audience Records Home Entertainment

C. P. Jaeger has been elected vice-president in charge of manufacture and sales of Audience Records, Inc., a new corporation uniting leading radio and motion picture stars as director-stockholders for production of record albums. H. Paul Warwick is president and Norman Merrill is vice-president in charge of recording. Albums are to feature complete home entertainment programs, produced with music and full casts before studio audiences in Hollywood and New York. Corporation offices are at 230 Park Avenue, New York, and 6331 Hollywood Boulevard, Hollywood, Calif.

Triad Transformers

Triad Transformer Mfg. Co. has been formed in Los Angeles and has taken over the inventory and equipment of the Electronic Components Co. L. W. Howard is head of the new company and associated with him is O. D. Perry. The company will specialize in transformers for the radio, aviation and other electronic fields. Headquarters have been established at 423 N. Western Avenue.

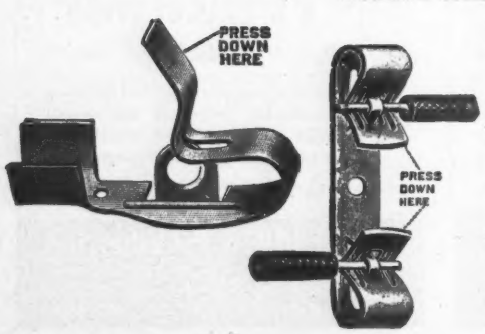
Fahnestock Clips
RADIO'S GREATEST CONVENIENCE



FAHNESTOCK SPRING BINDING POST GRIPS THE WIRE BY THE ACTION OF A SPRING

No tools required to make the connection. Grips the wire with just the right pressure for good electrical contact. Simply press down, insert the wire and let go. Does not injure wire, hence connection can be made or opened as often as desired. Available in large variety of types and sizes to fit any radio purpose and any requirement as to position, space or method of attachment. You will find them in the better sets.

Positive contact; cannot jar loose. Brass or bronze — nonrusting.



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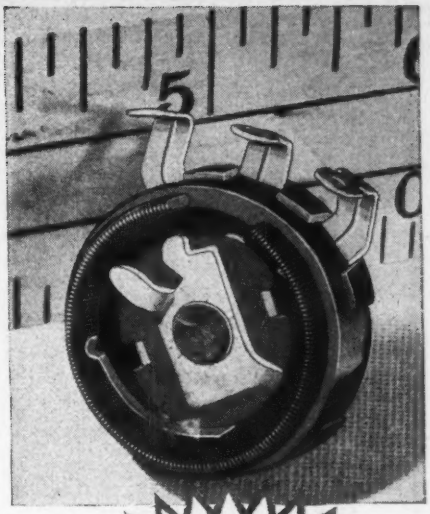


Midget WIRE-WOUND Controls

★ Clarostat Series 43 wire-wound potentiometers and rheostats are interchangeable mechanically (dimensions, mountings, shafts, terminals, etc.) with composition-element Series 37 Clarostat controls. Space-savers. Dependable. Long life. Often preferred to larger controls for resistance values up to 10,000 ohms linear.

Bakelite body with protective metal cover (shown removed in illustration).

1 to 10,000 ohms. Standard tolerance, within 10% plus or minus.

Power rating: 2 watts average. Single tap at center can be provided. Tapers not practical.

300° mechanical rotation, 280° electrical, without switch, 260° with switch.

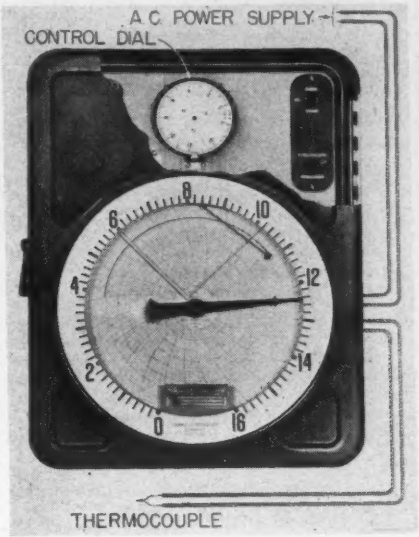
★ For engineering data on this handy midget wire-wound control, write for Bulletin No. 116.

CLAROSTAT Controls and Resistors

CLAROSTAT MFG. CO., Inc. · 285-7 N. 6th St., Brooklyn, N. Y.

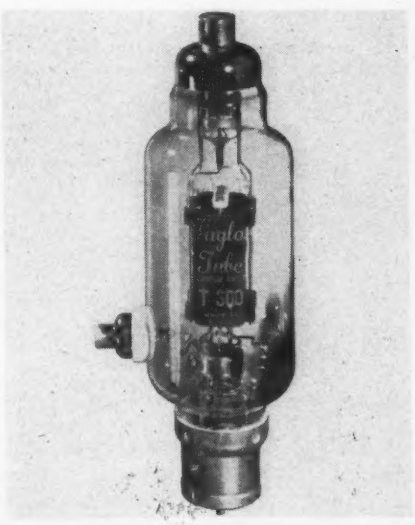
ELECTRONIC PRODUCTS

(*Continued from page 93*)



Potentiometer-Pyrometer

An electronic potentiometer-pyrometer which has no moving or vibrating parts records one or two temperatures on a 12 in. diam. chart and indicates on a 29 in. bold scale. The instrument operates from a thermocouple or any dc source with a minimum variation of 10 millivolts for full scale. The dc potential is balanced against a conventional potentiometer circuit with dc-ac converter being used in conjunction with an electronic detector to measure the unbalance. **Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.**—Electronic Industries

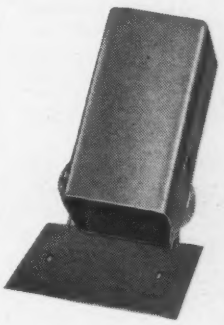


Transmitting Tube

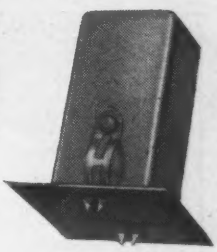
Designed for the medium power field or for high power audio applications the type T 300 transmitting tube has greater peak emission and longer life than the HF-300, KU-23, and the DR-300, for which it may be substituted. Having a carbon plate the tube will provide 600 watts output in class C telegraphy with a driving power of approximately 20 watts, and a miximum plate dissipation of 200 watts. Filament voltage is 11 V. at 6 amps., max. plate voltage is 3000, and the amplification factor is given as 23. **Taylor Tubes, Inc., 2312 Wabansia Ave., Chicago, Ill.**—Electronic Industries

New! PALNUT SHIELD CAN FASTENER*

• Lower Assembly Cost
• Strong Positive Grip
• No tolerance problems



Live spring arch holds can tightly against chassis.



Will not pull out until deliberately released.

A quick snap of the Palnut Shield Can Fastener into the chassis provides a secure job—faster, cheaper than other fastening methods. Good group contact is maintained. May be used on any chassis thickness.

SAMPLES *and data on Palnut Shield Can Fasteners sent upon request on your company letterhead.*

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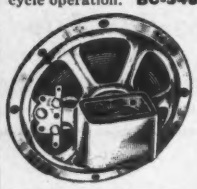
WELLS-GARDNER BC-348-N Communications Receiver. 6 Bands—200-500 KC. and 115 MC. to 18 MC. in 5 Bands. 2 stages RF., 3 stages IF., Beat Frequency Oscillator, Crystal I.F. Filter, Manual or Automatic A.V.C. Complete with tubes and 24 V.D.C. input dynamotor power supply, but supplied with complete instructions and diagrams for converting to 110 V.A.C. 60 cycle operation. **BC-348-N** **$53.95**



ALNICO V 5" P. M. SPEAKER
New Alnico V magnet provides maximum performance with minimum weight. Normal wattage 3, peak wattage 4½. V.C. impedance 3.2 ohms, depth 2 7/16". **$1.98** **5B7009** . . .

CARBON THROAT MICROPHONE
Will work into any 200 ohm impedance input circuit. Has adjustable strap to fit any neck. Ideal for ultra high frequency mobile work for hams. Supplied with strap, 10' cord and plug. **5B7060** .. **49¢**

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Solar Elim-O-Stat. Completely shielded. Type EN106. **5B3218** Each **$1.79**

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Strips wire instantly! Fastens to bench or other support. Wire stripped to any length. Strips wire up to 12 MM diam. Each **98¢**
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TUNER UNIT TU-10-B
Continuous frequency range from 10 MC. to 12.5 MC. VFO oscillator tuning section, buffer, coupling, capacitors and choke & buffer output matching tapped coil & condenser. Size 16⅜" lg. x 7⅜" h. 5½" deep. **A54132** **$2.95**

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Large 3 mfd., 4000 v. DC. condenser, hermetically sealed in an aluminum can. Size 4½ x 3 11/16 x 7¾" high. **5B3168** **$4.95**

D.C. MILLIAMMETERS
2½" flange mounting type. Black dull finish bakelite case. Mtg. Hdwe. included —Large, clearly legible dial calibrations. Either **5B4122**—0-20 M.A.D.C. or **5B4116**—0-300 M.A.D.C. Special . . **$3.23**

T-17-B 200 Ohm Carbon Mike. Lightweight, with press-to-talk button. Built-in filter to suppress carbon hiss. 5' rubber covered cable and PL-68 3-circuit plug supplied. **5B7062.** **$2.49**
Midget Volume Control — 1 Meg. ohm Standard ¾" Bushing, ¼" dia. Shaft, ¾" long, with split spline for push-on knob. **C3154** . . . . **35¢**
STANCOR Universal Output Transformer Type A3856. Primary for all single or push-pull plates. Secondary adjustable from 1 to 30 ohms. Two-inch mounting centers. 4 watts at 35 mils. **C1675.** SPECIAL **$1.32**

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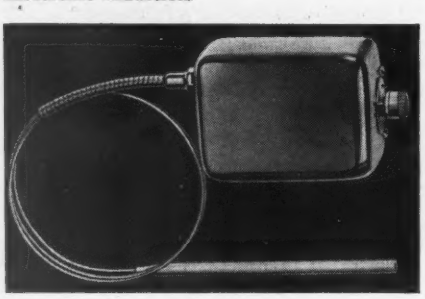
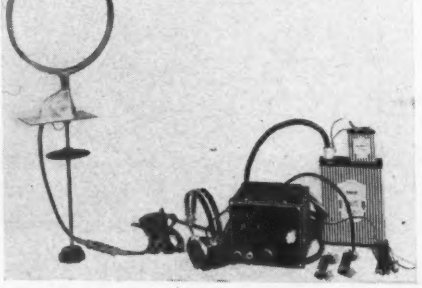
Voltage Regulator

Designed for aircraft use and general industrial applications the model D-500 ac voltage regulator uses lightweight transformers and is hermetically sealed to withstand an ambient temperature range of —55° to +70° C. The unit has input voltage range from 95 to 125 volts, output from 110 to 120 V. with a frequency range from 360 to 500 cps. Within a load range from 50 to 500 VA regulation accuracy is 0.5% and harmonic distortion less than 5%. Transient recovery time of the regulator is approximately 4 cycles. **Sorenson & Co., Inc., 375 Fairfield Ave., Stamford, Conn.**—Electronic Industries



Thermostat

For industrial applications requiring control of temperatures over narrowly calibrated ranges, type O Thermostat of the remote bulb type, may be used for all liquids or gases non-injurious to brass, or for metal to metal applications. The assembly consists of a liquid-filled copper thermal assembly which actuates a remote snap-action switch. It may be adjusted in increments of 120° or 250° F in the range from —120° to 600° F. Four different bulb types are available. **United Electric Controls Co., 69-71 A Street, Boston 27, Mass.**—Electronic Industries



Radio Range Receiver

This postwar aviation range receiver and aural-null loop combination incorporates new circuits and components, which make possible greater selectivity and clearer reception. The unit, known as the AMRL-1, is composed of a directly controlled radio range receiver powered by dry cell batteries; manually operated aural-null rotable loop; headphones and shock mounts; etc. Receiver covers the 195-405 kc range, and has provision for interphone communications. **Lear, Inc., Grand Rapids, Mich.**

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FERRANTI INTERSTAGE TRANSFORMERS

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25 or 10,000 to 25,000 or 100,000
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Micro Switches, yellow back, S.P.S.C. Potentiometers; all ohmages; slotted and long shafts.

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4 Conductor—black plastic covered cable—suitable for intercomms.

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Transmitting Condensers; a large variety of capacities and voltages.

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Bathtub Condensers; variety of capacities and voltages.

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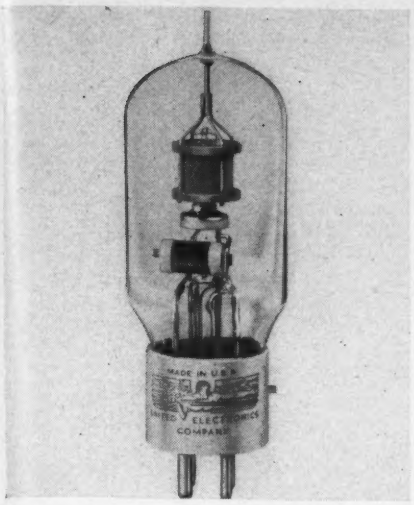
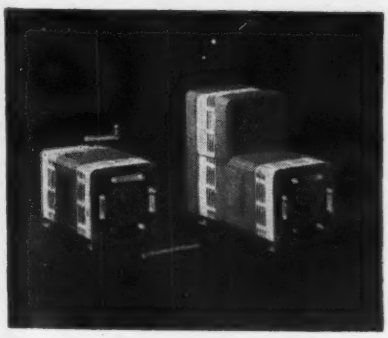


Graphite Anode Beam Tube

Designed to surmount the disadvantage of short service life in high temperature anode tubes, the type 5562 VHF tetrode with its graphite anode and isolated getter trap is one of the smallest commercial graphite anode tubes and has low operating temperature. With a filament voltage of 6.3 at 3 amps., the tube has an amplification factor of 60, transconductance of 2500 micromhos, and is good up to 120 mc for maximum ratings. As Class C rf amplifier it will provide 60 watts output with a driving power of 2 watts.—**United Electronics Co., 42 Spring St., Newark 2, N. J.**

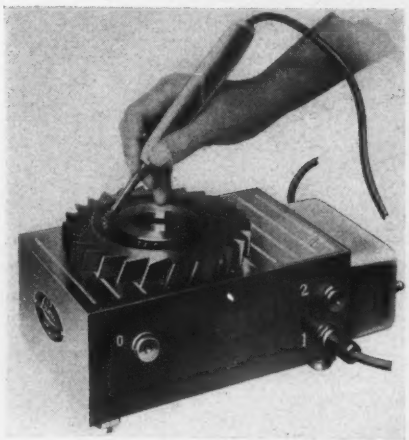


Induction Voltage Regulators

The 300 and 600 VA Inductrols have been added to the line of dry-type induction voltage regulators. The units are available either hand or motor operated for providing a variable output voltage from a constant supply, or "automatic" for maintaining a regulated output voltage from a varying supply voltage. **The Transformer Div. of General Electric, Schenectady, N. Y.**—Electronic Industries

Geiger-Mueller Counter

Built for industrial research or the physical laboratory Model 337 Geiger-Mueller Counter registers and counts radioactive impulses, utilizing a scale of 64 with provision for switching to a scale of 8, if desired. The impulse register, shock-mounted and insulated, is contained within the instrument. Power supply is ac operated and continuously variable from 0 to 2000 volts. Front panel controls include switching of power, reset, start and stop counting, panel light indication, and aural monitoring with volume control adjustment.—**Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio.**—Electronic Industries



Etchtool & Demagnetizer

Adapted to deep etching on polished surfaces, this combination etchtool and demagnetizer has a tungsten marking point. The point will permanently mark the hardest steel, stainless steel and steel alloys. It is not necessary to cut down writing speed to increase marking depth, as depth is automatically controlled. Has 5 ft. cable, which is detachable. Three other marking points, elkonite, copper and carbon, are available. As a demagnetizer, it will demagnetize tools that have been in contact with a magnetic chuck, and will perform either of its two operations without a setup delay. **Luma Electric Equipment Co., 1106 Dorr St., Toledo 1, Ohio.**—Electronic Industries

ATTENTION ENGINEERS

Experienced engineers with Bachelor's, Master's, or Doctor's degrees in Electrical Engineering, Communications, Radio, Physics, Mathematics. At least two years experience in design and development of radar and television systems, electronic navigational systems, automatic computers, servomechanisms, etc., required. Specialists in High Frequency transmitters, receivers, antennas, aircraft electronic components particularly desired. Starting salary commensurate with experience. Exceptional opportunity for the right men. Write McDonnell Aircraft Corporation, Lambert-St. Louis Municipal Airport, Box 516, St. Louis (21), Missouri.

MICRO WAVE EQUIPMENT

MAGNETRONS!! Type 2J32 (JAN.) just released. The 2J32 is designed for 10 cm. operation. Rated at 300 kw feet pulse power. Complete information supplied. Brand new. Listed at $200.
OUR PRICE...$25.50
3J31's just received. One cm magnetron.
OUR PRICE... 20.00

KLYSTRON tubes 723ab for 3 cm operation. Reduced to 7.75
30 mc oscillator-amplifier, with 2-6AC7's. Uses 723a/b. Waveguide input, 1N21 xtal detectors. With 6AC7 tubes 10.00
Thermistor Beads, for use with UHF and Micro-Wave Equipment list.....Each 3.00
In separate sealed containers, for use in RF power measurement ..... .95

3 CM WAVE GUIDE SECTIONS

Silver Plated Directional Couplers with a 20 DB drop with:
A. Straight Wave Guide section 6" long..... $3.95
B. 15° bend in wave guide 15" 5.90
C. 30° bend in wave guide 10" long 4.75
D. 90° bend in wave guide 15" long also 90° bend in coupler 6.50

WAVE GUIDE SECTIONS

E. 6-inch section silver plated wave guide with 90° twist 2.95
F. 2½ foot silver plated with 90° bend (2" radius) 5.50
G. 150° bend, with 90° twist 3½" radius with pressurizing nipple and coax coupler... 3.95
H. 3 CM wave guide sections 5 foot long, per ft. 1.95

RA-58A POWER SUPPLY

This unit supplies continuously variable voltages between 500 & 15,000 VDC @ 35 MA. Uses 2 705-A tubes in a voltage doubler circuit using 2 1-Mmf capacitors. RMS ripple voltage maximum 6%. Operates from 115 v 60 cy source. Variable voltage is obtained by means of a Variac in the primary circuit of the high voltage transformer.
PRICE $116.00

OIL FILLED HI-POWER CONDENSERS

14F191 .1mf 10000v (list $37) $6.75
26F585-G2 .06 mf. 15000v (list $25)..... 5.95
23F47 2mf 4000v 5.95
23F49 1mf-5000v 4.75
15mfd 350vdc 1.95
4000mfd @ 30vdc 2.35

BRAND NEW C.R. TUBES

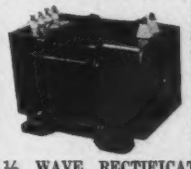
Type	List	Cost
3BP1	15.00	3.95
3FP7	27.00	3.35
5BP1	20.00	4.95
5BP4	27.00	5.95
5CP1	48.00	4.95
5CP7	45.00	6.00
5FP7	35.00	4.95
5JP2	48.00	8.75

HI POWER XMTR TUBES

Type	List	Cost
837	2.80	1.50
872A	7.50	3.50
705A	22.50	7.50
241B-WE	85.00	50.00
861	155.00	95.00

RELAYS

DPDT 10a contacts. 115v/60 cps coil..... $1.59
SPST 5a, ac; 115v cont. 115v/60 cps..... 1.25
SPDT contacts; 5a coil rated 115v/60c..... 1.39
DPDT 115v/60c. cont. rating 5a..... 1.49
DPDT relay. Steatite insulated, with 10 amp silvered contacts. Operates on 110 a.c..... 1.69
SPDT sensitive keying relay, 5 MA-DC Coil. 110V/60 cycles—2 Amp contacts..... 1.25
SPDT mercury contact switch rated #D-168479 @ 125 V 1 amp. 28VDC. 2 operating coils: 1-200 ohms 2, 3300 ohms mounted in standard metal octal tube, size 6F6..... 1.00



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6 HY. 700 M. A. CHOKES can be used with Amertran transformers 7.95
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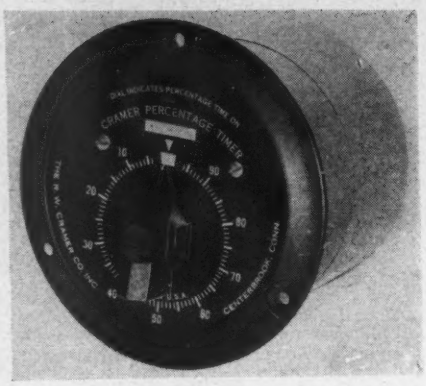
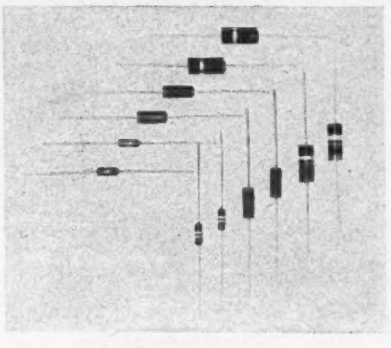


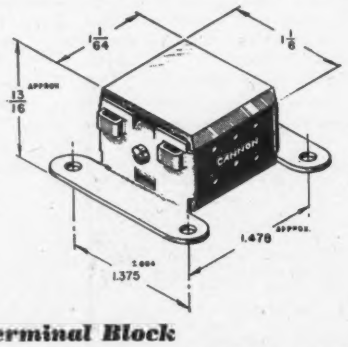
Percentage Timer

Type PE percentage timer for use on ac automatically controls the percentage of time of opening or closing any electrical circuit out of a definite length of time, and is useful for regulation of ovens, furnaces, blowers, pumps, etc. The timer consists essentially of a self-starting synchronous motor which drives a positive snap acting switch mechanism rated at 250 watt incandescent lamp load. It is available in 12 speeds ranging from one revolution in 15 seconds through one in 24 hrs. Standard dials are calibrated in steps of 1% from 4% to 96%. **R. W. Cramer Company, Inc., Centerbrook, Conn.**



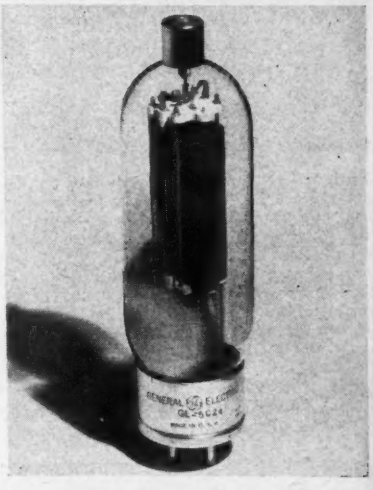
Composition Resistors

Composition resistors capable of operation at full rating in ambient temperatures up to 70° are available in standard RMA resistance values for ½, 1, and 2 watts. An RMS voltage of 350, 500, or 1000 volts may be applied continuously to the ½, 1, and 2 watt units respectively. The resistors will withstand high humidity and have excellent stability. **Specialty Div., Wolf Street Plant, General Electric Co., Syracuse, N. Y.**



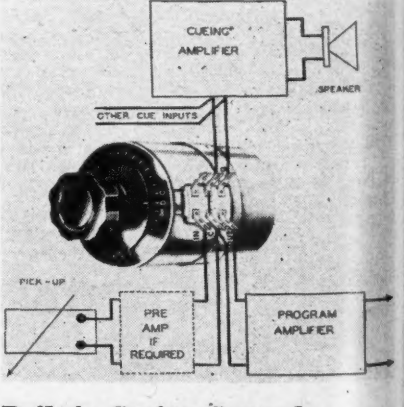
Terminal Block

Designed for aircraft, radio, and other equipment carrying many low amperage circuits the type Y6 terminal block is a compact and flexible terminal disconnect device, molded of phenolic. The basic unit is a six-socket contact block with foot brackets, to which additional units may be added vertically or horizontally by means of side brackets and top interlocking strips. Contacts are made of silver-plated brass and accommodate No. 16 AWG wire for 5-amp. circuits.—**Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Cal.**



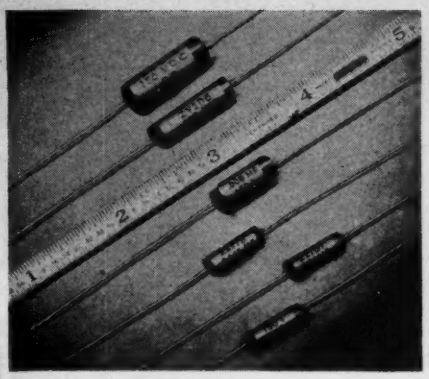
Transmitting Tubes

Two new transmitting tubes are available. Forced-air-cooled, Type GL-5518, designed for use as class C rf amplifier and oscillator, is adapted for grounded-grid circuit applications. A pair of tubes have a power output of 12.9 kw at a dc plate voltage of 6,000. Type GL-5C24 for class A and class AB_1 af amplifier and modulator service has a mu of 8, and will provide 55 watts output for a peak af grid voltage of 150 and plate voltage of 1,500 volts.—**Tube Div., Electronic Dept., General Electric Co., Schenectady, N. Y.**



Built-in Cueing Control

Direct cueing controls, which have a wide application in broadcast stations, recording stations, wire music service and the sound film industry, are now built in on this line of attenuators. The control transfers program material to a separate cueing amplifier, and eliminates the need for additional switching devices. Provision is made at the extreme attenuation position for connecting the incoming signal to a cue circuit before fading in the signal. A lug on the terminal board is provided for connection to the cueing system. **Daven Co., 191 Central Ave., Newark 4, N. J.**—Electronic Industries

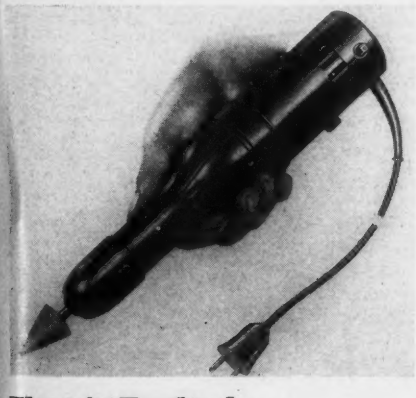


Midget Capacitors

Planned for application in portable tranceivers and radios, pocket meters and hearing aids, these midget capacitors have 2 in. unbreakable leads. Standard ZY units are ¾ in. in length and from 3/16 to 11/32 in. in diameter. Values range from .0001 mfd to .006 mfd at 600 v dc, .002 to .02 mfd at 400 v., .004 to .02 at 200 v., and .01 to .05 mfd at 150 volts. ZZ units are available in a range from .0001 mfd to .01 mfd at 150 vdc. **Cornell-Dubilier Electric Corp., South Plainfield, N. J.**

Turntable Stand

Record changers may be supported in any convenient position on this phono turntable stand which is adjustable, about 15 in. above the work bench. Pivoted clamps permit the record changer to rotate for easy accessibility. **General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.**—Electronic Industries



Electric Handtool

The new Precise-40 electric handtool and portable grinder has 1/5 hp and speeds to 40,000 rpm for grinding, milling, drilling, finishing, and polishing of metals, plastics, and glass. The tool set includes a precision quill fitted with a No. 0 Morse taper, a Jacob's chuck for small arbors, and special spindles to extend the quill length. The tool may be used alone or mounted in a vise, lathe, or milling machine. Accessories for special uses are also available. **Precise Products Co., 1328-30 Clark St., Racine, Wis.**—Electronic Industries

Lightweight Battery

A new 45 volt B battery of the Mini-Max type having only half the weight and size of pre-war models has been developed for use with electronic industrial test equipment, portable amplifiers, etc. The reduction in size and weight is made possible by printing the carbon electrode in a thin layer on the zinc plate. The battery weighs 4 lbs. 4 oz. and displaces only 76.6 cu. in. **National Carbon Co., Inc., 30 E. 42nd St., New York.**—Electronic Industries

Miniature Magnetic Receiver

The Telex magnetic receivers for hearing aids and similar use provide high fidelity and clarity under extreme atmospheric conditions, being operative from —30° to ± 160° F. Weighing less than ½ oz. they have a sensitivity of 18 dyns per cm² for 10 microwatts input and an impedance of 128 ohms per receiver. **Electro-Acoustic Div., Telex, Inc., Minneapolis, Minn.**

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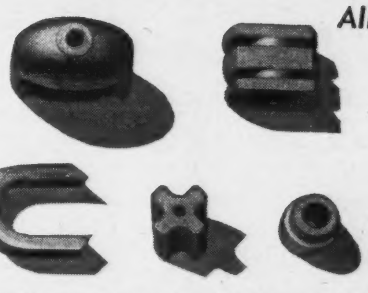

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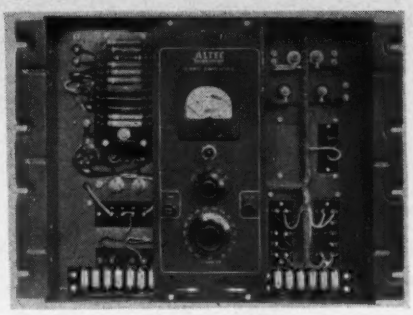
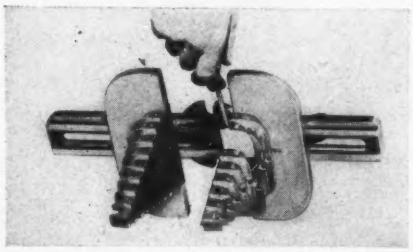


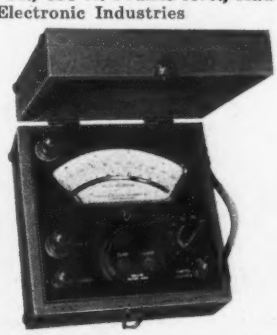
High Quality Amplifier

Designed primarily as a high power recording amplifier using preemphasis and outside-inside equalization, the A-255 amplifier provides a maximum gain of 65 db with frequency response uniform within 1 db from 20-20,000 cycles. A 6SJ7 pentode operating a 6V6 as phase inverter to drive a pair of 807 tubes provides 40 watts output with 8% intermodulation—approx. 2% tot. harmonic distortion. The output transformer is tapped for 10 and 20 ohm loads. The unit operates on 105 to 130 volts, 50-60 cycles, ac, and consumes 200 w. **Altec Lansing Corp., 1161 North Vine St., Hollywood 38, Cal.**—Electronic Industries



Concentric Winding Head

Considerable savings in production time are possible through this winding head designed for the production of concentric coils for many types and sizes of single phase motors, from a coil for a 1/20th hp, 24-slot 6-pole stator to coils for a 3 hp, 36-slot 2-pole stator, the latter 7 coils to a group. It comprises nine pairs of segments, large to small sizes, eight of them adjustable by means of a screw. By referring to an accompanying chart, operators can set segments to the proper dimensions without removing the head. Thus it can save many hours formerly wasted in set-up time, and also eliminates the problem of labeling and storing many sets of forms. **Continental Electric Co., 650 N. Prairie Ave., Hawthorne, Calif.**—Electronic Industries



DC Voltmeters

Type 501-F multi-voltmeter will measure dc voltages from 1 milli-volt to 1000 volts in eleven overlapping ranges with an accuracy of ½%. Sensitivity of the instrument is 10,000 ohms per volt, the max. current drain being 100 microamps. on any range at full scale. All resistances are wire-wound. An increased sensitivity of 100,000 ohms per volt with a current drain of 10 microamps. is available in the type 501G which in all other respects is similar to type 501F. **Rawson Electrical Instrument Co., 116 Potter St., Cambridge, Mass.**—Electronic Industries

Adds Radiophone

Wilcox Electric Co., Kansas City, Mo., has formed a new Telephone Division, which will produce a combination radio and automatic dial telephone exchange. This combination will use telephone for short distances, and radio for point to point communications. Another unit combines telephone communication with a public address system. By dialing a specified number, any phone in the system automatically becomes a microphone, and the entire organization can be addressed. John H. Van Horn, who joined the company in September, will be chief engineer of the new division. He was with the Automatic Electric Co., Chicago, as a design and project engineer from 1939 to 1942.

Asco Enlarges

The Asco Corp., Cleveland is occupying a new and larger building at 17702 Waterloo Road, Cleveland. The company manufactures mechanical and electrical components and has been doing business from 874 E. 140th Street, Cleveland. The move will provide additional production facilities.

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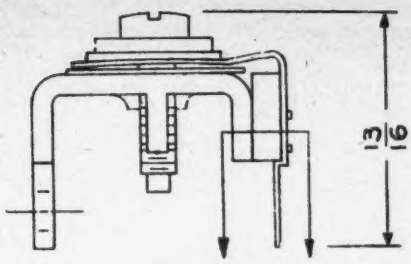
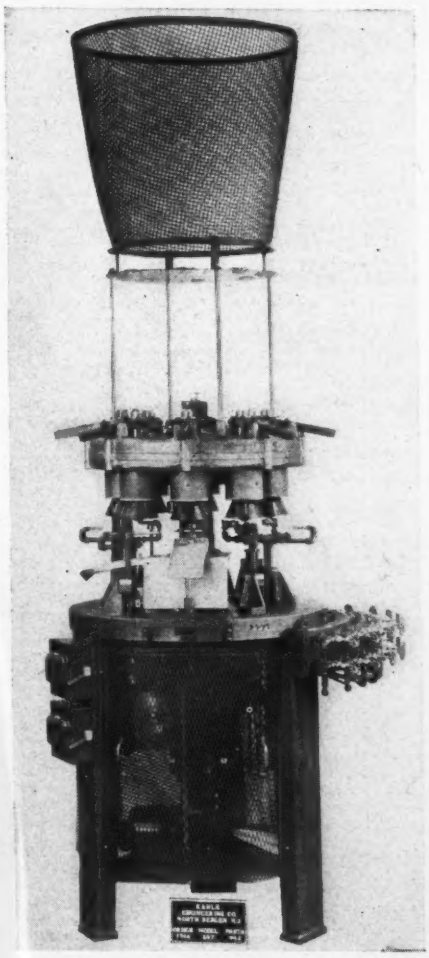


Mica Trimmer Capacitors

Designed to meet all normal coil requirements for radio and electronic uses, five mica trimmer capacitors having a combined range from 5 to 370 mmfd are available for antenna, rf, or oscillator trimmers, or for use as neutralizing or balancing capacitors. The units are made of high grade India ruby mica, and are not affected by variations in humidity and altitude. They have a minimum Q of 200 at 1000 kc, the leakage resistance being better than 2,000 megohms at 300 volts dc. Screw adjustment of the trimmers is very smooth and remains permanently set. **Lear, Inc., Grand Rapids, Mich.**—Electronic Industries



Hot Cut Flare Machine

An automatic high speed hot cut flare machine designed for the production of glass parts in tube manufacture will handle soft or hard glass with a speed of 2400 per hour on ordinary flares. The unit can accommodate tubing diameters from ¼ to 1⅛ in. and flare diameters up to 1¾ in., the max. length being 3 in. Eight heads with removable jaws are provided. An automatic tubing cutting machine and a bulb and ampule blowing machine are built on the same chassis and will handle the same tubing sizes. The tubing is blown into moulds, and the bulbs or ampules are automatically cut off. **Kahle Engineering Co., 1307-09 Seventh St., North Bergen, N. J.**

Flash Tube

Type R-4340 electronic flash tube provides a peak output of 48 million lumens for color, and black and white photography uses. Spectral characteristics are almost flat between 4000 and 7000 angstroms giving it daylight quality. The tube is suitable for capacitor discharge circuits and will give a flash of 1/5000 second duration by discharge of a 120 mfd capacitor at 2500 volts. Tube life is rated at more than 10,000 flashes with a max. repetition rate of four times per minute. **Sylvania Electric Products Inc., 500 Fifth Ave., New York 18.**—Electronic Industries

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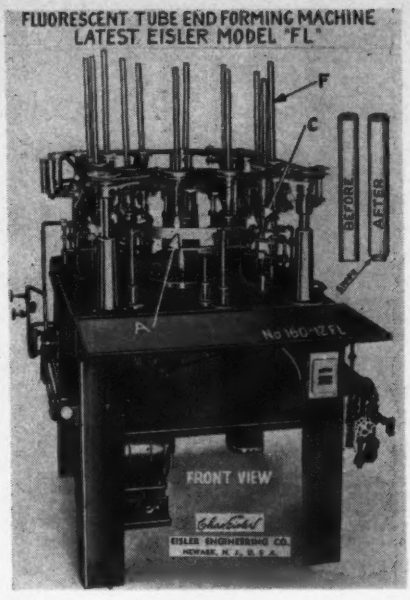

Tube Forming Machine

A machine for shaping the ends of fluorsecent tubes consists essentially of twelve chucks and a barrel cam which moves the chucks from station to station. The machine, powered by a ½ hp motor is fully automatic; it is necessary only to invert the tubes after one end has been shaped. The chucks can hold sizes from 1 in. to 2⅛ in. O.D., and from 700 to 900 tubes an hour may be handled. Fuels used for heating the tubes are gas, air, and oxygen. **Eisler Engineering Co., Dept. 34, 743 South 13th St., Newark 3, N. J.**—Electronic Industries

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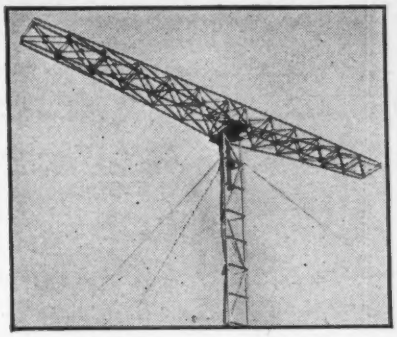
Two current transformers for meter, relay, and control device applications have been developed for various laboratory uses. One, the JKL-3, is rated 5,000 volts, 1200 amperes, and is designed to withstand full-wave impulse tests at 60 kv in accordance with ASA standards. The other, the JKL-4 is rated 8700 volts, 1200 to 4000 amperes, and will withstand full-wave impulse tests at 75 kv. Both the JKL-3 for 2400- and 4800-volt lines, and the JKL-4 for 7200-volt lines, have been designed for accurate metering over the normal current range up to 100% of rating, and for relay operation up to 20 times rated current. **General Electric Co., Schenectady 5, N. Y.**—Electronic Industries



Rotary Beam Antenna

The Trylon rotary beam antenna support is intended for a 4-element, 20 meter array for amateur use. The support is constructed of lightweight stainless steel, is designed to withstand wind and icing conditions, and may be erected with a screwdriver. Ball bearing design provides full 360° traverse actuated by manual or motor drive. **Wind Turbine Co., Tower and Antenna Div., West Chester, Pa.**—Electronic Industries

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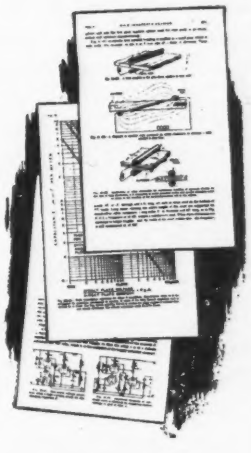

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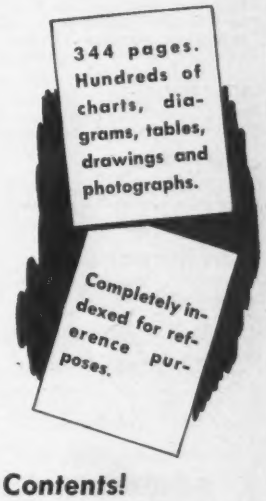

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Designed to replace bulkier or obsolescent tubes, such as the 6D6, 6U7G, 6K7, 6SK7, etc., these miniature cathode type rf amplifier tubes are the electrical equivalent of the 6SK7 and 12SK7. Designated as the 6BD6 and the 12BD6, they enable manufacturers to use standard IF transformers at a considerable saving in production costs. Special features include: remote cut-off characteristics, zero-bias operation without cathode resistors, and proper operating characteristics with or without series screen-dropping resistor. **Raytheon Mfg. Co., Newton, Mass.**—Electronic Industries

Tunable Dipole

A new television and FM dipole has been designed to help eliminate ghosts and weak reception on certain stations in low areas. The dipole arms are adjustable, and the adjustable feature consists of an uhf element that is calibrated from 1.0 to 21.5 in half steps. A broad band of frequencies can be covered including black and white or color television, FM, glide paths, airport controls, etc. **Kings Electronics, 372 Classon Ave., Brooklyn 5, N. Y.**

Volt-Ammeter

A clip-on volt-ammeter consisting of a current transformer and 2½ in. dial rectifier type instrument provides five current ranges from 0 to 1000 amps. and two voltage ranges from 0 to 600 volts with an accuracy of 3% full scale. For current measurements the core is opened and the instrument is clipped over a single core cable or other current-carrying conductor. Range can be extended downwards by looping the conductor twice or more through the core aperture. Sensitivity on voltage ranges is approx. 333 ohms per volt. **Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20.**—Electronic Industries

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Believing that a directory is only as useful as its index, Electronic Industries has thoroughly cross-referenced all product listings under their various common names.

This Directory of radio-electronic-television sources of supply, is most complete and up-to-date, having been totally compiled and revised during 1946, with a final check-survey of manufacturers and their products completed as late as March and April of the present year.

To find the manufacturer of any product, look first in the Index, beginning on this page. For example, "Counters, electronic 12-C", means that under Section 12, "Electronic Control Equipment", the letter "C" after a manufacturer's name indicates his ability to supply electronic counting devices.

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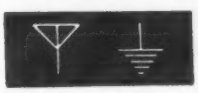
ELECTRONIC ENGINEERING DIRECTORY

Listings of all products and items entering into radio, radar, and industrial electronic equipment

(1) Antennas & Accessories



Airplane antenna ..... **AA**
All-wave (home) ..... **AW**
Antenna reeling equipment ..... **AR**
Auto ..... **A**
Dummy antenna ..... **DA**
Feeder spreaders ..... **FS**
Ground clamps ..... **G**
Grounding springs ..... **GS**
HF assemblies ..... **HF**
Insulators ..... **I**
Kits ..... **K**
Lightning arresters ..... **L**
Loop antennas ..... **LA**
Master systems ..... **MS**
Outlets ..... **O**
Railroad ..... **RR**
Rotary beam ..... **RB**
Television & FM ..... **TL**
Towers & Supports (home) ..... **T**

Aeronautical Radio Mfg. Co., 155 First St., Mineola, L. I., N. Y.—AA, I, LA
Air Communications, Inc., 2233 Grand Ave., Kansas City, Mo.—LA
Aireon Mfg. Corp., Fairfax & Funston Rds., Kansas City 15, Kan.—AA, LA
Airplane & Marine Instruments, Inc., Clearfield, Pa.—LA, RR
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—AA, DA, HF
Airtronics Development Corp., 131-133 E. Third St., Dayton 2, Ohio—HF
Alpha Wire Corp., 50 Howard St., New York 13, N. Y. G, I, K, L, MS, TL
American Bridge Co., Frick Bldg., Pittsburgh, Pa.—TL, T
American Communications Corp., 306 Broadway, New York, N. Y.— A, W, G, K, LA, MS, O
American Radio Hardware Co., 152-4 MacQuesten Parkway, S., Mt. Vernon, N. Y.—I
Amy, Aceves & King, Inc., 11 W. 42nd St., New York 18, N. Y.—"Multicoupler"—AW, MS, O, TL
Andrew Co., 363 E. 75th St., Chicago 19, Ill.—HF
Ansonia Electrical Co., 63 Main St., Ansonia, Conn.—TL
Atlas Products Corp., 30 Rockefeller Plaza, New York 20, N. Y.—G
Atlas Sound Corp., 1443 39th St., Brooklyn 18, N. Y. TL, T
Barker & Williamson, Upper Darby, Pa.—DA, FS, HF, I, K, LA, MS, RB, TL
Bassett, Rex, Inc., 307-11 N. W. 1st Ave., Ft. Lauderdale, Fla.—AA, LA
Belden Mfg. Co., P. O. Box 5070A, Chicago 80, Ill.—AW, G, I, K, L
Bendix Aviation Corp., Bendix Radio Div., E. Joppa Rd., Baltimore, Md.—RR
Birco—Birnbach Radio Co.
Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—HF
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N. Y.—"Birco"—AW, FS, G, I, K, L, TL
Bittermann Electric Co., 50 Henry St., Brooklyn 2, N. Y.—LA
Blaw Knox Co., Blaw Knox Div., Box 1198, Pittsburgh 30, Pa.—TL, T
Charles J. Bodnar Co., 68 Marbledale Rd., Tuckahoe 7, N. Y.—"BRL"—TL
Brach Mfg. Corp., L. S., 55 Dickerson St., Newark 4, N. J.—AW, A, HF, TL, T
BRL—Charles J. Bodnar Co.
Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio—FS, I
Burton-Rogers Co., 857 Boylston St., Boston 16, Mass.—A
Carborundum Co., Globar Div., Niagara Falls, N. Y.—DA, L
Centralab Div. of Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis—I
Clampipe—Mueller Electric Co.
Columbia Wire & Supply Co., 4106 N. Pulaski Rd., Chicago 41, Ill.—AW, K, TL
Commercial Radio Sound Corp., 575 Lexington Ave., New York 22, N. Y—AW, MS, TL
Communications Co., Inc., 300 Greco Ave., Coral Gables 34, Fla.—AA, DA, LA, RR
Continental-Diamond Fibre Co., Newark 50, Del.—I
Copperweld Steel Co., Glassport, Pa.—AA, G
Cook Ceramic Mfg. Co., 500 Prospect St., Trenton, N. J.—I
Corning Glass Works, Corning, N Y.—"Pyrex"—I
Cornish Wire Co., Inc., 15 Park Row, New York 7, N. Y.—"Noise-Master"—AW, G, HF, K, L
Dalmo Victor, Div. of Goldfield Consolidated Mines Co., 1414 El Camino Real, San Carlos, Calif.—AA
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—AA, DA, HF
DeMornay-Budd, Inc., 475 Grand Concourse, New York 51, N. Y.—HF
Diamond Instrument Co., North Ave., Wakefield, Mass.—AA, DA
Dielectric Products Co., Inc., 125 Virginia Ave., Jersey City 5, N. J.—RB, TL
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—A, FS, G, O
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—AA, A, HF
Drake Co., R. L., 11 Longworth St., Dayton 2, Ohio—LA
D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—AW, LA
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza, S., Long Island City 1, N. Y.—G, K
Electrical Reactance Corp., Franklinville, N. Y.—AW, A, LA
Electro-Marine Co., 274 Madison Ave., New York 16, N. Y.—HF, O
Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—AA
Electronic Plumbing Corp., 311 Nepperhan Ave., Yonkers 2, N. Y.—HF, TL
Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—TL
Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—HF
Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—AA
Elkay Radio Products, 305-9 E. Walnut St., Oglesby, Ill.—K
Erco Radio Laboratories, Inc., 231 Main St., Hempstead, L. I., N. Y.—AA, A, LA
Essex Electronics, 1060 Broad St., Newark 2, N. J.—LA
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, L. I., N. Y.—LA
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—A, HF, RB, TL
Fleron, M. M., & Son, Inc., 113 N. Broad St., Trenton, N. J.—"Fleron"—AW, G, I, K, L, O, TL, T
Franklin Airloop Corp., 175 Varick St., New York 14, N. Y.—LA
Franklin Mfg. Corp., A. W., 175 Varick St., New York 14, N. Y.—LA
Gardiner Mfg. Co., 2711 Union St., Oakland 7, Calif.—I
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—A, K, LA
General Ceramics & Steatite Corp., Crows Mill Rd., Keasbey, N. J.—I
General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—AR, LA
General Winding Co., 420 W. 45th St., New York 19, N. Y.—"Gen-Win"—AW, HF, TL
Gen-Win—General Winding Co.
Gussack Machined Products Co., 10-20 45th Rd., Long Island City 1, N. Y.—AA, AW, LA
Harco Tower, Inc., 1180 E. Broad St., Elizabeth 4, N. J.—TL, T
Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N. J.—DA
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—AW, LA, TL
Higgins Industries, Inc., 2221 Warwick Ave., Santa Monica, Calif.—HF
Howard Pacific Corp., 932 N. Western Ave., Los Angeles 27, Calif.—HF
ICA—Insuline Corp. of America
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—"ICA"—AW, A, I, K, L, LA, TL
International Derrick & Equipment Co., 875 Michigan Ave., Columbus 8, Ohio—TL, T
International Products Corp., 2554 Greenmount Ave., Baltimore 18, Md.—AR, I.
Interstate Mfg. Corp., 125 Sussex Ave., Newark 4, N. J.—AW, A
Intex Co., 303 W. 42nd St., New York 18, N. Y.—A
Islip Radio Mfg. Corp., Islip, N. Y.—AA, AR, LA
Isolantite, Inc., 343 Cortlandt St., Belleville 9, N. J.—FS, HF, I
Jacksonville Metal Mfg. Co., 247 Riverside Ave., Jacksonville 4, Fla.—T
Jefferson, Inc., Ray, 40 E. Merrick Rd., Freeport, L. I., N. Y.—HF
J.F.D. Mfg. Co., 4117 Fort Hamilton Parkway, Brooklyn 19, N. Y.—"JFD"—AW, A, I, K, LA, TL
Johnson Co., E. F., Waseca, Minn.—DA, FS, I, RB
Kaar Engineering Co., 619 Emerson St., Palo Alto, Calif.—A
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—G, L
Kent, Walter A., Co., 2826 W. 55th St., Chicago, Ill.—TL
Kings Electronics Co., 372 Classon Ave., Brooklyn 5, N. Y.—AA, DA, HF, I
Krischer Metal Products Co., 631-7 Kent Ave., Brooklyn 11, N. Y.—G
Lapp Insulator Co., Inc., 24 Craigie St., Le Roy, N. Y.—DA, FS, I
Lavoie Laboratories, Matawan-Freehold Rd., Morganville, N. J.—AA, AW, A, HF, TL
Lehigh Structural Steel Co., 17 Battery Place, New York, N. Y.—T
Lenoxite Division, Lenox, Inc., 65 Prince St., Trenton 5, N. J.—I
Lewyt Corp., 60 Broadway, Brooklyn 11, N. Y.—HF

This Directory of radio-electronic-television sources of supply, is most complete and up-to-date, having been totally compiled and revised during 1946, with a final check-survey of manufacturers and their products completed as late as March and April of this year.

Lingo & Son, John E., Inc., 28th St. & Buren Ave., Camden, N. J.—TL
Link, Fred M., 125 W. 17th St, New York 11, N. Y.—A, HF, TL
Littelfuse, Inc., 4757 Ravenswood Ave., Chicago 40, Ill.—L
Locke Insulator Corp., P. O. Box 57, Baltimore 3, Md.—I
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.—I
Maguire Industries, 1437 Railroad Ave., Bridgeport, Conn.—HF, RR
McInerney Plastics Co., 25 Commerce Ave., S.W., Grand Rapids 2, Mich.—I
Mec-Rad Division of Black Industries, 1400 E. 222nd St., Cleveland 17, Ohio—AA, HF, TL
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—LA
Mendelsohn Speedgun Co., 457 Bloomfield Ave., Bloomfield, N. J.—O
Millen Mfg. Co., James, Inc., 150 Exchange St., Malden 48, Mass.—DA, FS, HF, I
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—AA, AR
Mueller Electric Co., 1583 E. 31st St., Cleveland 14, Ohio—"Clampipe"—"Universal"—G
Multicoupler—Amy, Aceves & King
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—LA
Mycalex Corp. of America, 60 Clifton Blvd., Clifton, N. J.—I
M & Z Industrial Development Co., 32 W. 12th St., Bayonne, N. J.—TL
National Ceramic Co., 400 Southard St., Trenton 2, N. J.—I
New England Radiocrafters, 1156 Commonwealth Ave., Boston 34, Mass.—HF
Noise-Master—Cornish Wire Co., Inc.
Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—HF
Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill.—DA
Pacific Clay Products, SteaPactite Div., 306 W. Ave. 26, Los Angeles 31, Calif.—I
Philson Mfg. Co., Inc., 156 Chambers St., New York 7, N. Y.—A, TL
Pilot Radio Corp., 37-06 36th St., Long Island City 1, N. Y.—AW
Pioneer Specialty Co., 5100 St. Jean Ave., Detroit 13, Mich.—A
Plymold Corp., Lawrence, Mass.—T
Porcelain Products, Inc., Findlay, Ohio—I
Premax Products, Div. Chisholm-Ryder Co., Inc., 4612 Highland Ave., Niagara Falls, N. Y.—AW, RB
Publix Metal Prod. Inc., 100 6th Ave., New York 13, N. Y.—RB
Pyrex—Corning Glass Works
Radiart Corp., 3571 W. 62nd St., Cleveland 2, Ohio—A, TL
Radio Craftsman, 1341 S. Michigan Ave., Chicago 5, Ill.—LA
Raytron, Inc., 407 N. Jackson St., Jackson, Mich.—HF, MS, O, TL, T
Republic Steel Corp., Republic Bldg., Cleveland 1, Ohio—T
Rice's Sons, Bernard, 325 Fifth Ave., New York 16, N. Y.—AA, DA, HF, TL
Rogers Diesel & Aircraft Corp., 1120 Leggett Ave., New York 59, N. Y.—AR
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—I
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—AR
Schuttig & Co., Ninth & Kearny Sts., N.E., Washington 17, D. C.—HF
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—AA
Selectar Mfg. Corp., 21-10 49th Ave., Long Island City 1, N. Y.—HF
Shakespeare Products Co., 241 E. Kalamazoo Ave., Kalamazoo, Mich.—AA, AW, AR, A, TL, T
Shur-Antenna-Mount, Inc., 272 Sea Cliff Ave., Sea Cliff, N. Y.—HF, MS, TL, T
Small Motors, Inc., 1322 Elston Ave., Chicago 22, Ill.—DA, LA
Snyder Mfg. Co., 22nd & Ontario Sts., Philadelphia 40, Pa.—A, G, T
Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—A, TL
Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y.—LA
Spirling Products Co., 64 Grand St., New York 13, N. Y.—AA, AW, AR, A, DA, FS, G, GS, HF, I, K, L, LA, MS, TL
Standard Engineering Laboratories, 40 S. Oak Knoll Ave., Pasadena 1, Calif.—HF, K, MS, TL
Standard Winding Co., 44-62 Johnes St., Newburgh, N. Y.—LA
States Co., 10 New Park Ave., Hartford 6, Conn.—DA
Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—HF
Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.—I
Summerill Tubing Co., Bridgeport, Pa.—AA, A
Superior Tube Co., Norristown, Pa.—AW, A, RB, TL
S-W Inductor Co., 1056 Wood St., Chicago 22, Ill.—AR, LA
Taco—Technical Appliance Corp.
Technical Appliance Corp., 46-06 De Long St., Flushing, N. Y.—"Taco"—AA, AW, DA, G, HF, I, K, L, MS, O, TL, T
Technical Radio Co., 275 9th St., San Francisco, Calif.—HF
Telicon Corp., 851 Madison Ave., New York 21, N. Y.—MS, TL
Thermionic Engineering Corp., 32 W. 12th St. Plant—631 Broadway, Bayonne, N. J.—HF, TL
Thompson Co., John E., 1440 W. 47th St., Chicago 9, Ill.—AW, RB, TL
Transmitter Equipment Mfg. Co., Inc., 345 Hudson St., New York 14, N. Y.—DA, TL, T
Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis.—G
Triumph Mfg. Co., 913 W. Van Buren St., Chicago 7, Ill.—DA
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—AW
Universal—Mueller Electric Co.
Universal Clay Products Co., 1528 First St., Sandusky, Ohio—I
Van Huffel Tube Corp., Warren, Ohio—AA
Vidal Research Corp., Central Airport, Camden 1, N. J.—T
Ward Products Corp., 1523 E. 45th St., Cleveland 3, Ohio—AW, A, TL
Wincharger Corp., E. 7th at Division, Sioux City 6, Iowa—HF, TL, T
Wind Turbine Co., West Chester, Pa.—K, TL, T
Winters & Crampton Corp., Grandville, Mich.—AA, A, HF, RB, TL
Workshop Associates, 66 Needham St., Newton Highlands 61, Mass.—AA, AW, A, DA, HF, K, LA, TL, T

USE THE INDEX

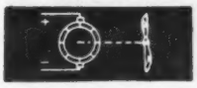
To find the manufacturer of any product, look first in the Index. For example, "Counters, electronic 12-C", means that under Section 12, "Electronic Control Equipment", the letter "C" after a manufacturer's name indicates his ability to supply electronic counting devices.

(2) Automatic Tuning Units & Parts

Face plates ..... see DIALS
Geared tuning units ..... GC
Inductance trimmer units ..... IT
Mechanical automatic selectors ..... MS
Push button motor operated units (complete) ..... PM
Push button trimmer units (complete) ..... PT
Remote controls ..... R
Switches ..... S
Trimmer condenser units ..... CU
Tuning motors ..... M

Acro Electric Co., 1305 Superior Ave., Cleveland 14, Ohio—S
Air Communications, Inc., 2233 Grand Ave., Kansas City, Mo.—R
Aladdin Radio Industries, Inc., 225 W. Jackson Blvd., Chicago, Ill.—IT
Alliance Mfg. Co., Alliance, Ohio—M
American Radio Hardware Co., 152-4 MacQuesten Pkwy. S., Mt. Vernon, N. Y.—S
Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—R
Automatic Mfg. Corp., 900 Passaic Ave., East Newark, N. J.—IT, PT, CU
Barker & Williamson, Upper Darby, Pa.—GC, MS, PM, R, S
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—IT
Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, N. Hollywood, Calif.—R
Centralab Div. of Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—S, CU
Cline Electric Mfg. Co., 4550 W. Lexington Ave., Chicago, Ill.—PM R
Communication Parts, 1101 N. Paulina St., Chicago 22, Ill.—IT, PT
Croname, Inc., 3701 N. Ravenswood Ave., Chicago 13, Ill.—GC, MS, R
Diamond H—Hart Mfg. Co.
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—MS, R, S
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—R
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza, S., Long Island City 1, N. Y.—R
Electrical Reactance Corp., Franklinville, N. Y.—MS, PM, PT, R, S, CU
Electro Motive Mfg. Co., South Park & John St., Willimantic, Conn.—CU
Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N. Y.—PM, R
Essex Electronics, 1060 Broad St., Newark 2, N. J.—IT
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—M
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—R, S
Fractional Motors Co., 1501 N. Halsted St., Chicago 22, Ill.—M
General Cement Mfg. Co., 919 Raylor Ave., Rockford, Ill.—S
General Winding Co., 420 W. 45th St., New York 19, N. Y.—"Gen-Win"—PT
Gen-Win—General Winding Co.
Globe Industries, Inc., 125 Sunrise Place, Dayton 7, Ohio—M
Grayhill, 1 N. Pulaski Rd., Chicago 24, Ill.—S
Hart Mfg. Co., Hamilton St., Hartford 1, Conn.—R, S—"Diamond H" Switches
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—CU
J.F.D. Mfg. Co., 4111 Ft. Hamilton Pkwy., Brooklyn 19, N. Y.—"JFD"—S
Kings Electronics Co., 372 Classon Ave., Brooklyn 5, N. Y.—CU
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—S
Kollsman Instrument Division, Square D Co., 88-08 45th Ave., Elmhurst, L. I., N. Y.—R, M
Kulka Electric Mfg. Co., 30 South St., Mt. Vernon, N. Y.—S
Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—MS
Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn.—S
Madison Electrical Products Corp., 78 Main St., Madison, N. J.—"Mepco"—M
Mepco—Madison Electrical Products Corp.
Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—CU
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.—"Yaxley"—"Mallory"—S
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—CU
Monitor Controller Co., 51 S. Gay St., Baltimore 2, Md.—PM, S
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—PT, S, CU
National Co., Inc., 61 Sherman St., Malden 48, Mass.—CU
New England Radiocrafters, 1156 Commonwealth Ave., Boston 34, Mass.—S
Oak Mfg. Co., 1260 Clybourn Ave., Chicago 10, Ill.—"Oak"—GC, MS, PM, S
Pilot Industries, Inc., 202 E. 44th St., New York 17, N. Y.—GC
Precision Parts Co., 1200 N. Main St., Ann Arbor, Mich.—IT, CU
Publix Metal Prod., Inc., 100 Sixth Ave., New York 13, N. Y.—GC
Reeves Sound Laboratories, Div. Reeves-Ely Laboratories, Inc., 62 W. 47th St., New York, N. Y.—R
Self Winding Clock Co., Inc., 475 Fifth Ave., New York 17, N. Y.—GC, MS, PM, R, M
Shakespeare Products Co., 241 E. Kalamazoo Ave., Kalamazoo, Mich.—R
Sickles, F. W., Co., 165 Front St., Chicopee, Mass.—IT, PT, CU
Small Motors, Inc., 1322 Elston Ave., Chicago 22, Ill.—M
Smith, F. A., Mfg. Co., Union & Augusta, Rochester 2, N. Y.—M
Sorensen & Co., Inc., 375 Fairfield Ave., Stamford, Conn.—R
Stackpole Carbon Co., P. O. Box 327, St. Marys, Pa.—"Stackpole"—S
Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—R
Stow Mfg. Co., Inc., Binghamton, N. Y.—R
S-W Inductor Co., 1056 Wood St., Chicago 22, Ill.—IT, PM
Taller & Cooper, 75 Front St., Brooklyn 1, N. Y.—GC, MS, PM, PT, R, S
Teleoptic Co., 1251 Mound Ave., Racine, Wis.—GC, S
Western Condenser Co., E. Walnut St., Watseka, Ill.—MS
Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—S
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.—R
Wilson Mfg. Co., Inc., 600 N. Andrews Ave., Ft. Lauderdale, Fla.—MS
Yardeny Laboratories, Inc., 105-107 Chambers St., New York 7, N. Y.—PM, R
Yaxley—P. R. Mallory & Co., Inc.

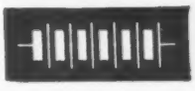
(3) Battery Chargers



Electronic tube rectified ..... **VC**
Gas engine driven ..... **G**
Hand cranked ..... **HC**
Metallic rectified ..... **MC**
Motor generator ..... **MG**
Vibrator rectified ..... **V**
Wind driven ..... **W**

Aarons Radio Corp., 125 E. 46th St., New York 17, N. Y.—V
Acme Electric & Mfg. Co., Cuba, N. Y.—MC
Acme Fire Alarm Co., Inc., 106 Seventh Ave., New York 11, N. Y.—MC
Allen Electric & Equipment Co., 2101-2117 N. Pitcher St., Kalamazoo 13-F, Mich.—VC, MC
Allis, Louis, Co., 427 E. Stewart St., Milwaukee 7, Wis.—MG
American Communications Corp., 306 Broadway, New York, N. Y.—VC, MC
American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—VC
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—"ATR"—MC, V
ATR—American Television & Radio Co.
Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—VC, MC
Automatic Electrical Devices Co., 324 E. 3rd St., Cincinnati 2, Ohio—MC
Barker & Williamson, Upper Darby, Pa.—VC, MC
Battery Boosters—Benwood Linze Co.
Benwood-Linze Co., 1815 Locust St., St. Louis 3, Mo.—"Battery-Boosters", "B-L"—MC
Biltmore Radio Corp., 15 Ave. A, New York 3, N. Y.—VC, MC
B-L—Benwood Linze Co.
Bogue Electric Co., 27 Kentucky Ave., Paterson 3, N. J.—MG
Breico Corp., 55 Van Dam St., New York 13, N. Y.—VC
Briggs & Stratton Corp., 2711 N. 13th St., Milwaukee, Wis.—G
Burke Electric Co., 12th & Cranberry, Erie, Pa.—HC
Carpenter Mfg. Co., Master Light Bldg., Boston 45, Mass.—MC
Carson Machine & Supply Co., 202 S. E. 29th St., Oklahoma City 9, Okla.—G, MC, MG
Carter Motor Co., 1608 Milwaukee Ave., Chicago 47, Ill.—HC
Climax Engineering Co., Clinton, Iowa—G, MC
Communication Equipment & Engineering Co., 5646 W. Race St., Chicago 44, Ill.—VC
Control Corp., 718 Central Ave., Minneapolis 14, Minn.—MC
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—HC
Delco Appliance Division, General Motors Corp., 391 Lyell Ave., Rochester 1, N. Y.—G
Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.—G, MG
Eicor, Inc., 1501 W. Congress St., Chicago 7, Ill.—G, HC, MG
Electric Heat Control Co., 9123 Inman Ave., Cleveland 5, Ohio—VC, MC
Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, Ohio—MG
Electrical Engrg. & Mfg. Corp., 4606 W. Jefferson Blvd., Los Angeles 16, Calif.—G
Electrical Facilities, Inc., 4224 Holden St., Oakland 8, Calif.—"Rexselen"—MC
Electrical Windings, Inc., 2015 N. Kolmar Ave., Chicago 39, Ill.—MC
Electricoil Transformer Co., 421 Canal St., New York 13, N. Y.—VC, MC
Electronic Laboratories, Inc., 122 W. New York St., Indianapolis 4, Ind.—V
Fansteel Metallurgical Corp., 2200 Sheridan Rd., North Chicago, Ill.—MC
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—MC
Flotrol—Lorain Products Corp.
France Mfg. Co., 10325 Berea Rd., Cleveland 2, Ohio—VC, V
Franklin Transformer Mfg. Co., 65 22nd Ave., N. E., Minneapolis 13, Minn.—MC, VC
Gardiner Mfg. Co., 2711 Union St., Oakland 7, Calif.—W
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—G, HC, MG
General Electric Co., 1285 Boston Ave., Bridgeport 2, Conn.—VC, MC
Goodall Electric Mfg. Co., 3rd & Main St., Ogallala, Nebr.—VC
Hannon Electric Co., 1605 Waynesburg Rd., S.E., Canton, Ohio—VC, G, MC, MG
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.—MG
Hartman Corp. of America, 6417 Manchester, St. Louis 10, Mo.—G, MC, MG
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—VC, MC
Hertner Elec. Co., 12690 Elmwood Ave., Cleveland 11, Ohio—G, MG
Horni Signal Mfg. Corp., 421 W. 54th St., New York 19, N. Y.—MC
Jacksonville Metal Mfg. Co., 247 Riverside Ave., Jacksonville 4, Fla.—VC, MG
Jacobsen Mfg. Co., 747 Washington Ave., Racine, Wis.—G
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—VC, G, MC, MG
Kohler Co., Kohler, Wis.—G
Laurehk Radio Mfg. Co., 3931 Monroe Ave., Wayne, Mich.—VC
Lorain Products Corp., 1122 F St., Lorain, Ohio—"Flotrol"—MC
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.—MC
McColpin-Christie Corp., 4922 S. Figueroa St., Los Angeles 37, Calif.—VC, MC
Mellaphone Corp., 1462 E. Main St., Rochester 2, N. Y.—MC
Mohawk Electric Mfg. Co., 60 Howard St., Irvington 6, N. J.—VC, MC
North Electric Mfg. Co., Box 417, Galion, Ohio—MC
Onan, D. W., & Sons, 3216 Royalston Ave., Minneapolis 3, Minn.—G
Pincor—Pioneer Gen-E-Motor Corp.
Pioneer Gen-E-Motor Corp., 5841-49 Dickens Ave., Chicago 39, Ill.—"Pincor"—G
Print Mfg. Co., 5775 N. Ridge Ave., Chicago 26, Ill.—MC
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—VC
Ready Power Co., 3826 Grand River Ave., Detroit, Mich.—G
Rectifier Engineering Co., 1809 E. 7th St., Los Angeles 21, Calif.—VC, MC, W
Rexselen—Electrical Facilities, Inc.
Richardson-Allen Corp., 15 W. 20th St., New York, N. Y.—VC
Rogers Diesel & Aircraft Corp., 1120 Leggett Ave., New York 59, N. Y.—VC, G, MG
Schauer Machine Co., 2060 Reading Rd., Cincinnati 2, Ohio—VC, MC
Selenium Corp. of America, 1719 W. Pico Blvd., Los Angeles 15, Calif.—MC
Sheldon Electric Co., Inc., 76 Colt St., Irvington 11, N. J.—VC
Sorgel Electric Co., 838 W. National Ave., Milwaukee 4, Wis.—VC, MC
Stancor—Standard Transformer Corp.
Standard Transformer Corp., 1500 N. Halsted St., Chicago 22, Ill.—"Stancor"—VC, MC
Stevens Arnold Co., 22 Elkins St., South Boston, Mass.—MC
United Transformer Corp., 150 Varick St., New York 13, N. Y.—MC
Universal Motor Co., 186 Harrison St., Oshkosh, Wis.—G
Warwick Mfg. Corp., 4640 W. Harrison St., Chicago 44, Ill.—HC
Westinghouse Elec. Corp., East Pittsburgh, Pa.—VC, MC, MG
Willard Storage Battery Co., 246-286 E. 131st St., Cleveland 1, Ohio—"Willard"—VC, MC
Wincharger Corp., E. 7th at Division, Sioux City 6, Iowa—MG, W

(4) Batteries, Dry & Wet



Air cell ..... **AC**
Bias cell ..... **BC**
Dry cell ..... **DC**
Hearing aid ..... **HB**
Radio dry batteries ..... **R**
Standard cells ..... **C**
Storage ..... **S**
Storage—non-spill ..... **SN**

Acme Battery Co., 59 Pearl St., Brooklyn 1, N. Y.—DC, R, C
Aeronautical Radio Mfg. Co., 155 First St., Mineola, L. I., N. Y.—S
Automatic Electrical Devices Co., 324 E. 3rd St., Cincinnati 2, Ohio—SN
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—S
Bond Electric Corp., 275 Winchester Ave., New Haven 4, Conn.—DC, R
Bright Star Battery Co., 200 Crooks Ave., Clifton, N. J.—DC, HB, R
Bryant Mfg. Co., 401 N. Paulina St., Chicago, Ill.—S
Burgess Battery Co., Foot of Exchange, Freeport, Ill.—DC, HB, R, C
Carbone Corp., 400 Myrtle Ave., Boonton, N. J.—DC
Carpenter Mfg. Co., Master Light Bldg., Boston 45, Mass.—SN
Centralab, Div. of Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—S, SN
Cinch Mfg. Corp., Div. United-Carr Fastener Co., 2335 W. Van Buren St., Chicago, Ill.—BC
Edison, Thomas A., Inc., Emark Div., Plant No. 1, Belleville Tpke, Kearny, N. J.—DC, R, S
Electric Storage Battery Co., 19th St. & Allegheny Ave., Philadelphia 32, Pa.—"Exide"—S, SN
Eppley Laboratory, Inc., 12 Sheffield Ave., Newport, R. I.—C
Exide—Electric Storage Battery Co.
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—S
General Dry Batteries, Inc., 13000 Athens Ave., Cleveland, Ohio—HB, DC, R
Gould Storage Battery Corp., 35 Neoga St., Depew, N. Y.—S
Hartman Corp. of America, 6417 Manchester, St. Louis 10, Mo.—S
Ideal Industries, Inc., 5194 Park Ave., Sycamore, Ill.—SN
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—DC, S, SN
Mallory, P. R., & Co., 3029 E. Washington St., Indianapolis 6, Ind.—DC
Marathon Battery Co., Wausau, Wis.—DC, HB, R, C
Monark Battery Co., Inc., 1240 N. Homan Ave., Chicago, Ill.—"Monark"—S
National Battery Co., 1728 Roblyn Ave., St. Paul, Minn.—S
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.—AC, DC, HB, R, C
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—R, S
Prest-O-Lite Battery Co., Inc., P. O. Box 1655, Indianapolis, Ind.—S, SN
Ray-O-Vac Co., 212 E. Washington Ave., Madison 3, Wis.—DC, HB, R
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—BC, DC, HB, R
Sturges Battery Co., Inc., 260 W. Broadway, New York, N. Y.—C, S, SN
Ucinite Co., Div. United-Carr Fastener Corp., Newtonville, Mass.—BC
United States Electric Mfg. Corp., 222 W. 14th St., New York 11, N. Y.—DC, R, C
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—S
Universal Battery Co., 3410 S. LaSalle St., Chicago, Ill.—S, SN
Willard Storage Battery Co., 246-286 E. 131st St., Cleveland 1, Ohio—"Willard"—DC, R, S, SN
Wincharger Corp., E. 7th at Division, Sioux City 6, Iowa—S

(5) Cabinets, Racks & Panels

Bins & racks ..... **B**
Carrying bags ..... **CB**
Chassis ..... **C**
Leather handles—straps ..... **L**
Metal cabinets ..... **M**
Panels ..... **P**
Plastic ..... **see PLASTIC MOLDERS**
Portable set cases ..... **PC**
Racks ..... **R**
Trays & tote baskets ..... **T**
Wood cabinets ..... **W**

Aarons Radio Corp., 125 E. 46th St., New York 17, N. Y.—W
Abel & Bach, 1000 W. St. Paul Ave., Milwaukee, Wis.—PC
Acro Tool & Die Works, 4554 Broadway, Chicago 40, Ill.—C
Acromark Co., 9-13 Morrell St., Elizabeth 4, N. J.—P
Adler Mfg. Co., 2901 W. Chestnut St., Louisville 11, Ky.—W
Airplane & Marine Instruments, Inc., Clearfield, Pa.—C, M, P, R
All-Steel Equipment Co., 723 Griffith Ave., Aurora, Ill.—M
Aluminum Goods Mfg. Co., 1512 Washington St., Manitowoc, Wis.—C, M
American Central Mfg. Corp., 18th & Columbia Sts., Connersville, Ind.—M
American Communications Corp., 306 Broadway, New York, N. Y.—W
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.—P
American Radio Hardware Co., 152 MacQuesten Pkwy., S., Mt. Vernon, N. Y.—C, P
Arkay Laboratories, Inc., 1570 S. First St., Milwaukee 4, Wis.—C, M, P
Aro Equipment Corp., Enterprize & Trevitt, Bryan, Ohio—M, R
Belber Trunk & Bag Co., Railroad Ave., Woodbury, N. J.—PC
Bitter, A., Construction Co., 721 E. 133rd St., New York, N. Y.—B, C, W
Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio—C, M, P, R
Cardwood Products Corp., 201 S. Second Ave., Mt. Vernon, N. Y.—CB, W

Castlewood Mfg. Co., 12th & Burnett Sts., Louisville, Ky.—W
Caswell-Runyan Co., Huntington, Ind.—W
Chicago Sound Systems, Inc., 2124 S. Michigan Ave., Chicago, Ill.—W
Churchill Cabinet Co., 2119 Churchill St., Chicago 47, Ill.—W
Cole Steel Equipment Co., 349 Broadway, New York 13, N. Y.—M, P
Collins Radio Co., Cedar Rapids, Iowa—M, R
Columbia Associates, 141 W. 24th St., New York, N. Y. —P, R, W
Columbia Metal Box Co., 260 E. 143rd St., New York 51, N. Y.—C, M, P, R
Commercial Metal Products Co., 2251 W. St. Paul Ave., Chicago 47, Ill.—C
Corry-Jamestown Mfg. Corp., 32 N. First Ave., Corry, Pa.—C, M, P
Croname, Inc., 3701 N. Ravenswood Ave., Chicago 13, Ill.—M, P
Custom Case Co., 104 Bleecker St., New York, N. Y. —PC
Dahlstrom Metallic Door Co., Buffalo & E. 2nd, Jamestown, N. Y.—C, M, P, R
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—C, P, T, W
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—B, C, L, M, P
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—C, M
Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—C
Edwards, T. J., Inc., 210 South St., Boston 5, Mass. —P
Electrical Reactance Corp., Franklinville, N. Y.—P
Electro-Marine Co., 274 Madison Ave., New York 16, N. Y.—C, M
Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—C, P
Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—C, M, P
Electronic Supply Co., 207 Main St., Worcester 8, Mass.—C, P, R
Emerson Radio & Phonograph Corp., 111 8th Ave., New York 11, N. Y.—W
Erie Art Metal Co., 1602 E. 18th St., Erie, Pa.—C, P, M
Etched Products Corp., 39-01 Queens Blvd., Long Island City, N. Y.—P
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, L. I., N. Y.—C
Fairfield Lumber Co., 1700 Post Rd., Fairfield, Conn. —B, P, R, T, W
Falstrom Co., Falstrom Ct., Passaic, N. J.—B, M, P
Feick Mfg. Div., Detroit Aircraft Prod., Inc., 10225 Meech Ave., Cleveland 5, Ohio—C, M, P, R
Flock Process Co., Velvetone Div., 3 Quincy St., Norwalk, Conn.—W
Gardiner Mfg. Co., 2711 Union St., Oakland 7, Calif. —C, M, R, T
Goat Metal Stampings, Inc., 314 Dean St., Brooklyn 17, N. Y.—C
Goodall Electric Mfg. Co., 3rd & Main St., Ogallala, Nebr.—B, M, P
Grammes, L. F., & Sons, Inc., 392 Union St., Allentown, Pa.—M, P, R
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.—PC
Greenhut Insulation Co., 31 W. 21st St., New York, N. Y.—P
Haddorff Piano Co., 630 S. Wabash Ave., Chicago 5, Ill.—W
Hadley, Robert M., Co., 707 E. 61st St., Los Angeles 1, Calif.—C, M, P, R
Hall Co., Gordan L., Old Lyme, Conn.—B
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—C, M, P, W
Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—C, M, P
Heller, W. C., & Co., 1944 Caldwell St., Montpelier, Ohio—W
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—W
Hofstatter's Sons, Inc., 42-53 24th St., Long Island City 1, N. Y.—P, PC, W
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—C, M, P, R
ICA—Insuline Corp. of America
Illinois Cabinet Co., 2525 11th St., Rockford, Ill.—W
Illinois Wood Products Corp., 2512 S. Damen Ave. Chicago 8, Ill.—W
Industrial Fabricators, Inc., 1890 Carter Rd., Cleveland 13, Ohio—P, T
Insuline Corp. of America, 3602 35th Ave., Long Island City 10, N. Y.—"ICA"—C, M, P, R
Islip Radio Mfg. Corp., Islip, N. Y.—L, M, P, R
Jacksonville Metal Mfg. Co., 247 Riverside Ave., Jacksonville 4, Fla.—M, P, R
J.F.D. Mfg. Co., 4111 Ft. Hamilton Pkwy., Brooklyn 19, N. Y.—W
Johnson, E. F., Co., Waseca, Minn.—C, M, P, R
Karp Metal Products, 129 30th St., Brooklyn 32, N. Y.—B, CB, C, L, M, P, R, T
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—M, P, R, W
Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—P
Klise Mfg. Co., 50 Cottage Grove St., S.W., Grand Rapids 2, Mich.—P, R, W
Korrol Mfg. Co., 350 Greenwich St., New York 13, N. Y.—C, M, P, R
Kraus, Walter S., Co., 43-10 48th Ave., Woodside, L. I., N. Y.—M, W
Langevin Co., Inc., 37 W. 65th St., New York 23, N. Y.—M
Le Febure Corp., 716 Oakland Rd., N.E., Cedar Rapids, Iowa—M, W
Lewisburg Chair & Furniture Co., Lewisburg, Pa.—P, R, W
Lewyt Corp., 60 Broadway, Brooklyn 11, N. Y.—C, R
Lindsay & Lindsay, 222 W. Adams St., Chicago 6, Ill.—M
Lindsay & Thomas, Inc., 60 E. 42nd St., New York 17, N. Y.—M
Link, Fred M., 125 W. 17th St., New York 11, N. Y. —C, M
Long, L. J., Co., 186 Grand St., New York 13, N. Y. —C
Lorentzen, H. K., Inc., 391 W. Broadway, New York 12, N. Y.—C, M, P, R
Mayer Mfg. Corp., 45 Division Pl., Brooklyn 22, N. Y. —B, C, M, P
McInerney Plastics Co., 25 Commerce Ave., S.W., Grand Rapids 2, Mich.—T, W
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—C, M, P, R
Metallic Arts Co., 243 Broadway, Cambridge 39, Mass. —B, C, M, P, R
Meyers Safety Switch Co., Inc., 423 Tehama St., San Francisco 3, Calif.—M, P, R
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—P
Millen, James, Mfg. Co., Inc., 150 Exchange St., Malden 48, Mass.—C, L, M, P, R
Milprint, Inc., 431 W. Florida St., Milwaukee 1, Wis.—CB
National Co., Inc., 61 Sherman St., Malden 48, Mass. —C, M, P, R
Neevel Mfg. Co., 1427 Chestnut St., Kansas City 1, Mo.—CB, PC, W
New England Etching & Plating Co., 25 Spring St., Holyoke, Mass.—P
New England Radiocrafters, 1156 Commonwealth Ave., Boston 34, Mass.—C, M, W
Olympic Tool & Mfg. Co., Inc., 39 Chambers St., New York 7, N. Y.—C, M, P
Paramount Radio Mfg. Co., 967 32nd St., Oakland 8, Calif.—P, R, W
Par Metal Products Co., 32-62 49th St., Long Island City, N. Y.—"Par-Met"—C, M, P, R
Paul & Beekman, Div. Portable Products Corp., 1801 Courtland St., Philadelphia 40, Pa.—C, M, P,
Penn Fibre & Specialty Co., 2024-30 E. Westmoreland St., Philadelphia 30, Pa.—P
Philco Corp., Tioga & "C" Sts., Philadelphia 34, Pa. —W
Porter Metal Products, 121 Ingraham St., Brooklyn 6, N. Y.—B, C, M, P, R, T
Premier Metal Etching Co., 2103 44th Ave., Long Island City 1, N. Y.—P
Purves Mfg. Co., 31 W. 11th St., Indianapolis, Ind. —W
Quality Hardware & Machine Corp., 5849 N. Ravenswood Ave., Chicago 26, Ill.—C
Radio Merchandise Sales, 550 Westchester Ave., New York 55, N. Y.—CB, W
Ra-Trom Corp., 78 W. 4th St., Boston 27, Mass.—C, M, P, R
Redi-Rack Corp., 141 W. 24th St., New York, N. Y. —R
Sanders Bros. Mfg. Co., 409 W. Main St., Ottawa, Ill.—P, R, W
Schloss Bros., A., Corp., 801 E. 135th St., Bronx 54, N. Y.—W
Scovill Mfg. Co., 99 Mill St., Waterbury 91, Conn. —R
Screenmakers, Inc., 64 Fulton St., New York 7, N. Y.—C, M, P, W
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—C, M, P, R, W
Security Steel Equipment Co., Avenel St., Avenel, N. J. —P, R, W
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—M, P
Simpson, Mark, Mfg. Co., 188 W. 4th St., New York 14, N. Y.—W
Skydyne, Inc., River Rd., Port Jervis, N. Y.—M, P, W
Slater Corp., N. G., 3 W. 29th St., New York 1, N. Y.—P, R, W
Sparks Mfg. Co., Ltd., 318 Jefferson St., Newark 5, N. J.—P, R, W
Spencer Cardinal Corp., Box 751, Marion, Ind.—W
Stamford Metal Specialty Co., 428 Broadway, New York 13, N. Y.—C, M, P
Standard Electric Time Co., 89 Logan St., Springfield 2, Mass.—P
Standard Engineering Laboratories, 40 S. Oak Knoll Ave., Pasadena 1, Calif.—C, M, P, R
Standard Pressed Steel Co., Jenkintown, Pa.—T
Steger Furniture Mfg. Co., Steger, Ill.—P, R, W
Sun Shoe Mfg. Co., 617 N. Aberdeen St., Chicago 22, Ill.—CB, L
Tonk Mfg. Co., 1910 N. Magnolia St., Chicago, Ill. —W
United Radio Mfg. Co., 191 Greenwich St., New York, N. Y.—C, P
United States Trunk Co., Inc., 951 Broadway, Fall River, Mass.—PC, W
Vaughan Cabinet Co., 3810 N. Clark St., Chicago 13, Ill.—W
Vibraloc Mfg. Co., 3597 Mission St., San Francisco 10, Calif.—W
Victory Mfg. Co., 1722 W. Arcade Pl., Chicago 12, Ill.—PC
Wabash Cabinet Co., Wabash, Ind.—P, R, W
Wallace, Wm. T., Mfg. Co., Chili & Madison Aves., Peru, Ind.—W
Waterman Products Co., Inc., 1900 N. 6th St., Philadelphia 22, Pa.—P, R, W
Watterson Radio Mfg. Co., 2700 Swiss Ave., Dallas 1, Tex.—W
Wells Gardner & Co., 2701 N. Kildare Ave., Chicago 39, Ill.—W
White Research Associates, 899 Boylston St., Boston 15, Mass.—P, R, W
Woodcraft Corp., 501 Salzburg Ave., Bay City, Mich. —W
Worcester Pressed Steel Co., Worcester, Mass.—C, P

(6) Capacitors, Fixed

Air, fixed	A
Ceramic insulated	C
Compressed gas	G
Electrolytic dry	ED
Electrolytic wet	EW
Fluorescent lamp units	FS
Glass	G
Industrial	I
Mica	M
Oil	O
Paper	P
Plug-in condensers	PF
Polystyrene insulated	PO
Silvered mica	S
Standard	ST
Temperature compensated	TC
Transmitting	T
Vacuum cond.	V

Aerovox Corp., New Bedford, Mass.—C, ED, FS, I, M, P, PF, PO, S, TC, T, ST, O
Aircraft-Marine Products, Inc., 1523 N. 4th St., Harrisburg, Pa.—T
Aldine Paper Co., Inc., 535 Fifth Ave., New York 17, N. Y.—P
American Condenser Co., 4410 N. Ravenswood Ave., Chicago 40, Ill.—A, ED, P, PF, T, O
Arco Electronics Inc., 135 Liberty St., New York 6, N. Y.—M
Atlas Condenser Products Co., 548 Westchester Ave., New York 55, N. Y.—ED, FS, P, O
Automatic Mfg. Corp., 900 Passaic Ave., East Newark, N. J.—C, S
Barker & Williamson, Upper Darby, Pa.—A, G, PF, T
Berger Electronics, 109-01, 72nd Rd., Forest Hills, N. Y.—EW, TC
Brown Engineering Co., 4635 S. E. Hawthorne Blvd., Portland 15, Ore.—ST
Capacitron Co., 849 N. Kedzie Ave., Chicago 51, Ill. —ED, FS, I, P, PF, T, C, EW, M, O
Cardwell, Allen D., Mfg. Corp., 81 Prospect St., Brooklyn 1, N. Y.—A, PF, T
Centralab, Div. Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—C, S, TC, T
Chicago Condenser Corp., 3255 W. Armitage Ave., Chicago 47, Ill.—FS, I, P
Collins Radio Co., Cedar Rapids, Iowa—T
Condenser Products Co., 1375 N. Branch St., Chicago 22, Ill.—FS, I, PO, T
Cornell-Dubilier Electric Corp., So. Plainfield, N. J.—ED, EW, FS, I, M, P, PF, S, ST, TC, T, O
Corning Glass Works, Corning, N. Y.—G, I, T
Cosmic Radio Corp., 699 E. 135th St., New York 54, N. Y.—ED, FS, P
Crystal Research Laboratories, Inc., 29 Allyn St., Hartford 3, Conn.—C, S, TC
Deutschmann, Tobe, Corp., Canton, Mass.—ED, EW, FS, I, M, P, PF, O
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y. —FS
Dumont Electric Co., 34 Hubert St., New York 13, N. Y.—ED, FS, I, M, P, S, ST, O
Eastern Electronics Corp., 41 Chestnut St., Newhaven, Conn.—ST
Ecco High Frequency Corp. 7020 Hudson Blvd., N. Bergen, N. J.—T
Eitel-McCullough, Inc., San Bruno, Calif.—V
Electrical Reactance Corp., Franklinville, N. Y.—C, FS, P, S, O
Electro Motive Mfg. Co., South Park & John St., Willimantic, Conn.—M, P, S

Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—C, ED, M, P
Erie Resistor Corp., 640 W. 12th St., Erie, Pa.—C, S, TC
Fansteel Metallurgical Corp., 2200 Sheridan Rd., North Chicago, Ill.—EW
Fast, John E., & Co., 3129 N. Crawford Ave., Chicago 41, Ill.—FS, I, P, PO, T, O
General Electric Co., 1 River Rd., Schenectady 5, N. Y.—V
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—ST
Girard-Hopkins, 1000 40th Ave., Oakland 1, Calif.—FS, I, P, PF, T, O
Glenn-Roberts Co., 3100 E. 10th St., Oakland 1, Calif.—I
Goodall Electric Mfg. Co., Ogallala, Nebr.—P
Gudeman Co., 361 W. Superior St., Chicago 10, Ill.—ED, I, P, PF, T, O
Guthman, Edwin I., & Co., Inc., 15 S. Throop St., Chicago 7, Ill.—P
Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y.—A, T
Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—ST
H. R. S. Products, 5707 W. Lake St., Chicago 44, Ill.—ED, FS, I, P, O
Illinois Condenser Co., 1616 N. Throop St., Chicago 22, Ill.—ED, EW, FS, I, P, PF, O
Industrial & Commercial Electronics, Belmont, Calif.—V
Industrial Condenser Corp., 3243 N. California Ave., Chicago 18, Ill.—ED, FS, I, P, PF, PO, ST, T, O
Industrial Instruments, Inc., 17 Pollock Ave., Jersey City, N. J.—ST
International Products Corp., 2554 Greenmount Ave., Baltimore 18, Md—M
Intex Co., 303 W. 42nd St., New York 18, N. Y.—ED, P
Islip Radio Mfg. Corp., Islip, N. Y.—T
Jeffers Electronics, Hoover St., DuBois, Pa.—C
Jennings Radio Mfg. Co., McLaughlin Rd., San Jose 12, Calif.—V
Johnson, E. F., Co., Waseca, Minn.—A, G, T
Kellogg Switchboard & Supply Co., 6650 S. Cicero, Chicago 38, Ill.—I, P, PF
Kidde, Walter & Co., Inc., 140 Cedar St., New York 6, N. Y.—G
Kilburn, J. R., Glass Co., Inc., 22 S. Worcester St., Chartley, Mass.—C
Lapp Insulator Co., Inc., 24 Craigie St., Le Roy, N. Y.—G, T
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.—ST
Lenoxite Division, Lenox, Inc., 65 Prince St., Trenton 5, N. J.—C
Macallen Co., Macallen St., Boston 27, Mass.—M
Magnavox Co., Ft. Wayne 4, Ind.—ED
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.—ED, P, O
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—M
Micamold Radio Corp., 1087 Flushing Ave., Brooklyn 6, N. Y.—C, ED, FS, I, M, P, PF, S, TC, T, O
Michigan Fluorescent Light Co., 71-77 S. Parke St., Pontiac, Mich.—FS
Millen, James, Mfg. Co., Inc., 150 Exchange St., Malden 48, Mass.—A, T
Milprint, Inc., 431 W. Florida St., Milwaukee 1, Wis.—P
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—C, TC
National Ceramic Co., 400 Southard St., Trenton 2, N. J.—C
Noma Electric Corp., 55 W. 13th St., New York 11, N. Y.—M
Nord Mfg. Co., 205 Spruce St., Bridgeport, Conn.—P
O'Donnell, J. P., & Sons, 316 Stuart St., Boston 16, Mass.—FS, P
Philco Corp., Tioga & "C" Sts., Philadelphia 34, Pa.—C, ED, EW, M, P, S, O
Polymet Condenser Co., 699 E. 135th St., New York, N .Y.—ED, P
Potter Co., 1950 Sheridan Rd., North Chicago 1, Ill.—FS, I, P, ST, T, V, ED, O
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—I, T
Richardson-Allen Corp., 15 W. 20th St., New York 11, N. Y.—ST
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—PO
Sangamo Electric Co., 11th & Converse Sts., Springfield, Ill.—M
Sickles Co., F. W., 165 Front St., Chicopee, Mass.—A, S
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—A, T
Solar Capacitor Sales Corp., 285 Madison Ave., New York 17, N. Y.—ED, EW, FS, I, M, P, PF, PO, S, TC, T, O
Sprague Electric Co., 189 Beaver St., North Adams, Mass.—ED, FS, I, P, PF, S, ST, TC, T, O
Sprague Products Co., 89 Marshall St., North Adams, Mass.—C, ED, EW, FS, I, M, P, PF, S, T
Stackpole Carbon Co., P. O. Box 327, St. Marys, Pa.—PO
Technical Radio Co., 275 9th St., San Francisco, Calif. A, T
Telecon Condenser Co., 3757 W. North Ave., Chicago 47, Ill.—FS, I, P, PF, ST, T, O
Westinghouse Elec. Corp., East Pittsburgh, Pa.—I, T
Winslow Co., 9 Liberty St., Newark, N. J.—S
Winters & Crampton Corp., Grandville, Mich.—A, ST

(7) Capacitors, Variable

Air trimmer ..... **A**
Ceramic trimmer ..... **CT**
Compressed gas filled ..... **CG**
Mica trimmer ..... **M**
Neutralizing ..... **N**
Precision ..... **P**
Receiving tuning ..... **RT**
Transmitting tuning ..... **TT**
Vacuum ..... **V**

American Steel Package Co., Defiance, Ohio—A, RT
Arco Electronics, Inc., 135 Liberty St., New York 6, N. Y.—M
Automatic Mfg. Corp., 900 Passaic Ave., East Newark, N. J.—A, CT, M, N
Baldwin Instrument Co., Oceanside, N. Y.—RT
Barker & Williamson, Upper Darby, Pa.—A, CG, N, P, TT
Berger Electronics, 109-01 72nd Rd., Forest Hills, N.Y.—CT, RT
Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio—"Bud"—A, N, P, RT, TT
Cardwell Mfg. Corp., Allen D., 81 Prospect St., Brooklyn 1, N. Y.—A, N, P, RT, TT
Centralab, Div. Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—CT
Ceramicon—Erie Resistor Corp.
Collins Radio Co., Cedar Rapids, Iowa—TT
Crystal Research Laboratories, Inc., 29 Allyn St., Hartford 3, Conn.—CT, M
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—CG
Eimac—Eitel-McCullough, Inc.
Eitel-McCullough, Inc., San Bruno, Calif.—"Eimac"—V
Electrical Reactance Corp., Franklinville, N. Y.—CT, M, P
Electro Motive Mfg. Co., South Park & John St., Willimantic, Conn.—"Elmenco"—M
Elmenco—Electro Motive Mfg. Co.
Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—RT
Erie Resistor Corp., 640 W. 12th St., Erie, Pa.—"Ceramicon"—CT
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, L. I., N. Y.—P, RT, TT
Federal Mfg. & Engineering Corp., 199-217 Steuben St., Brooklyn 5, N. Y.—P
General Ceramics & Steatite Corp., Crows Mill Rd., Keasbey, N. J.—CT
General Electric Co., Specialty Division, 1001 Wolf St., Syracuse, N. Y.—A
General Instrument Corp., 829 Newark Ave., Elizabeth 3, N. J.—"G.I."—RT, TT
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—"GR"—A, P
G. I.—General Instrument Corp.
G. R.—General Radio Co.
Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y.—A, N, P, RT, TT
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—A, CT, N, P, RT, TT
ICA—Insuline Corp. of America
Industrial & Commercial Electronics, Belmont, Calif.—TT
Insuline Corp. of America, 3602 35th Ave., Long Island City 10, N. Y.—"ICA"—RT
International Products Corp., 2554 Greenmount Ave., Baltimore 18, Md.—M
Islip Radio Mfg. Corp., Islip, N. Y.—TT
Jennings Radio Mfg. Co., McLaughlin Rd., San Jose 12, Calif.—V
Johnson Co., E. F., Waseca, Minn.—"Johnson"—CG, N, TT
Kaar Engineering Co., 619 Emerson St., Palo Alto, Calif.—TT
Kidde, Walter & Co., Inc., 140 Cedar St., New York 6, N. Y.—CG
Lapp Insulator Co., Inc., 24 Craigie St., Le Roy, N. Y.—CG, N, TT
Macallen Co., Macallen St., Boston 27, Mass.—M
Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—A, RT
Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—A, CT
Meissner Mfg. Div., Maguire Industries, Inc., Mt. Carmel, Ill.—A
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—M
Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass.—A, M, N, P, RT, TT
National Ceramic Co., 400 Southard St., Trenton 2, N. J.—A, CT
National Co., Inc., 61 Sherman St., Malden 48, Mass.—"National"—A, CT, M, N, P, RT
North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—A
Oak Mfg. Co., 1260 Clybourn Ave., Chicago 10, Ill. A, RT, TT
Philco Corp., Tioga & "C" Sts., Philadelphia 34, Pa.—CT, M, N, RT, A
Precision Parts Co., 1200 N. Main St., Ann Arbor, Mich.—M
Radio Condenser Co., Copewood & David, Camden, N. J.—"R.C.C."—RT
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—TT
R. C. C.—Radio Condenser Co.
Searle Aero Industries, Inc., P. O. Box 111, Orange Calif.—RT
Scovill Mfg. Co., 99 Mill St., Waterbury 91, Conn.—TT
Sickles, F. W., Co., 165 Front St., Chicopee, Mass.—A, M
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—M, P
Solar Mfg. Corp., 285 Madison Ave., New York 11, N. Y.—"Solar"—M
Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—CT
Technical Radio Co., 275 9th St., San Francisco, Calif.—P, RT, TT
Teleradio Engineering Corp., 99 Wall St., New York 5, N. Y.—A, CT, M, P, TT
Vokar Corp., 7300 Huron River Drive, Dexter, Mich.—A, CT, M
Western Condenser Co., E. Walnut St., Watseka, Ill.—RT, TT
Westinghouse Elec. Corp., East Pittsburgh, Pa.—TT
Winters & Crampton Corp., Grandville, Mich.—P, RT, TT

(8) Coils, RF & IF

Coil forms ..... **F**
I F coils ..... **IF**
R F chokes (receiving) ..... **CH**
R F chokes (transmitting) ..... **RT**
R F coils (receiving) ..... **RF**
R F coils (transmitting) ..... **T**

Aladdin Radio Industries, Inc., 225 W. Jackson Blvd., Chicago, Ill.—IF, CH, RF, T
Albion Coil Co., Albion, Ill.—IF, CH, RT, RF, T
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—"Na-Ald"—F
American Coil & Engineering Co., 1271 N. Hermitage Ave., Chicago 22, Ill.—IF, CH, RT, RF, T
American Communications Corp., 306 Broadway, New York, N. Y.—CH, RT
Automatic Mfg. Corp., 900 Passaic Ave., East Newark, N. J.—F, IF, CH, RT, RF, T
Barker & Williamson, Upper Darby, Pa.—F, IF, CH, RT, RF, T
Bendix Radio, Div. of Bendix Aviation Corp., East Joppa Rd., Baltimore 4, Md.—IF, CH, RT, RF, T
Berger Electronics, 109-01 72nd Rd., Forest Hills, N. Y.—T
Bittermann Electric Co., 50 Henry St., Brooklyn 2, N. Y.—IF, CH, RT, RF, T
Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio—CH, RT
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—RT, T
Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass.—IF
Carron Mfg. Co., 415 S. Aberdeen St., Chicago 7, Ill.—"Carron"—IF, CH, RT, RF, T
Climax Engineering Co., Clinton, Iowa—CH, RT
Clippard Instrument Laboratory, 1440 Chase Ave., Cincinnati 23, Ohio—F, IF, CH, RF
Collins Radio Co., Cedar Rapids, Iowa—RT, T
Communication Parts, 1101 N. Paulina St., Chicago 22, Ill.—F, IF, CH, RT, RF, T
Continental-Diamond Fibre Co., Newark 50, Del.—F
Control Corp., 718 Central Ave., Minneapolis 14, Minn.—CH, RT, RF, T
Corning Glass Works, Corning, N. Y.—F, RF, T
Coto-Coil Co., Inc., 65 Pavilion Ave., Providence 5, R. I.—IF, CH, RT, RF, T
Crowley, Henry L. & Co., Inc., 1 Central Ave., West Orange, N. J.—F

Davis, Dean W. & Co., Inc., 549 Fulton St., Chicago, Ill.—F

Drake, R. L., Co., 11 Longworth St., Dayton 2, Ohio—IF, CH, RT, RF, T

D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—F, IF, CH, RT, RF, T

Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—IF, RF

Electrical Insulating Co., Inc., 12 Vestry St., New York 13, N. Y.—F

Electrical Reactance Corp., Franklinville, N. Y.—IF, CH, RF

Electrical Windings, Inc., 2015 N. Kolmar Ave., Chicago 39, Ill.—F

Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—IF, CH, RF, T

Electronic Winding Co., 6227 Broadway, Chicago 40, Ill.—RF, T

Emerson Radio & Phonograph Corp., 111 Eighth Ave. New York 11, N. Y.—IF, CH, RF

Ensign Coil Co., 2516 S. Pulaski, Chicago 23, Ill.—RF

Erco Radio Laboratories, Inc., 231 Main St., Hempstead, N. Y.—F, IF, RT, RF, CH, T

Essex Electronics, 1060 Broad St., Newark 2, N. J.—F, IF, CH, RT, RF, T

Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—IF, CH, RT, RF, T

Fast, John E., & Co., 3129 N. Crawford Ave., Chicago 41, Ill.—CH

Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—IF, CH, RT, RF, T

Fischer-Smith, Inc., 162 State St., West Englewood, N. J.—T

Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—IF, RF

General Electric Co., Specialty Division, 1001 Wolf St., Syracuse, N. Y.—IF

General Electric Co., Transmitter Division, Thompson Rd. Plant, Syracuse, N. Y.—RT, T

General Laminated Products, Inc., 2857 S. Halsted St., Chicago 8, Ill.—F

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—"G-R"—CH

General Transformer Corp., 1250 W. Van Buren St., Chicago 7, Ill.—F

General Winding Co., 420 W. 45th St., New York 19, N. Y.—"Gen-Win"—F, IF, CH, RT, RF, T

Gen-Win—General Winding Co.

G-R—General Radio Co.

Guthman & Co., Edwin I., Inc., 15 S. Throop St., Chicago 7, Ill.—IF, CH, RF

Hallicrafters Co., 2611 S. Indiana Ave., Chicago 16, Ill.—IF, RF

Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y.—F, IF, RT

Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N. J.—CH

Harvey Machine Co., Inc., 62 Avalon Blvd., Los Angeles 3, Calif.—RF, T

Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—F, CH, RT, RF, T

Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—F, IF, CH, RT, RF, T

Howard Pacific Corp., 932 N. Western Ave., Los Angeles 27, Calif.—IF, CH, RT

Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—IF, RF

Industrial Electronics Corp., 80 Bank St., Newark, N. J.—IF, CH, RT, RF, T

Insulating Tube Co., Inc., 26 Cottage St., Poughkeepsie, N. Y.—F

International Products Corp., 2254 Greenmount Ave., Baltimore 18, Md.—F

Islip Radio Mfg. Corp., Islip, N. Y.—IF, CH, RT, RF, T

Isolantite, Inc., 343 Cortlandt St., Belleville 9, N. J.—F

Jeffers Electronics, Hoover St., DuBois, Pa.,—IF, CH, RT

Jennings Radio Mfg. Co., McLaughlin Rd., San Jose 12, Calif.—RF, T

Johnson Co., E. F., Waseca, Minn.—"Johnson"—F, RT, T

Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—RF

Lectrohm, Inc., 5125 W. 25th St., Cicero 50, Ill.—CH

Lenoxite Division, Lenox, Inc., 65 Prince St., Trenton 5, N. J.—F

Madison Electrical Products Corp., 78 Main St., Madison, N. J.—"Mepco"—IF, CH, RT, RF, T

McInerney Plastics Co., 25 Commerce Ave., S. W., Grand Rapids 2, Mich.—F

Mayfair Molded Products Corp., 4440 N. Elston Ave., Chicago 30, Ill.—F

Megard Corp. 1601 S. Burlington Ave., Los Angeles 6, Calif.—F, IF, CH, RT, RF, T

Meissner Mfg. Div., Maguire Industries, Inc., Mt. Carmel, Ill.—IF, CH, RT, RF, T

Micarta Fabricators, Inc., 5324 Ravenswood Ave., Chicago 40, Ill.—F

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass.—F, IF, CH, RT, RF, T

Miller Co., J. W., 5917 S. Main St., Los Angeles 3, Calif.—"Miller"—IF, CH, RF

Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—IF, RF, T

Monarch Mfg. Co., 2014 N. Major Ave., Chicago 39, Ill.—F, IF, CH, RT, RF, T

Monroe Coil Co., 2659 W. 19th St., Chicago, Ill.—IF

Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—F, IF, CH, RT, RF, T

Mycalex Corp. of America, 60 Clifton Blvd., Clifton, N. J.—F

Na-Ald—Alden Products Co.

National Co., Inc., 61 Sherman St., Malden 48, Mass.—"National"—"N-C"—F, IF, CH, RT, RF, T

N-C—National Company

New York Transformer Co., 62 William St., New York, N. Y.—CH, RT, RF, T

Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill.—RT

Pacific Clay Products, SteaPACtite Div., 306 W. Ave. 26, Los Angeles 31, Calif.—F

Paramount Paper Tube Co., 801 Glasgow Ave., Ft. Wayne 4, Ind.—F

Peck Spring Co., 20 Grove St., Plainville, Conn.—F

Plastic Accessories, Inc., 460 Broome St., New York 13, N. Y.—F

Plax Corp., 133 Walnut St., Hartford 5, Conn.—F

Precision Paper Tube Co., 2035 W. Charleston St., Chicago 47, Ill.—F

Precision Parts Co., 1200 N. Main St., Ann Arbor, Mich.—IF, CH, RF

Printloid, Inc., 93 Mercer St., New York 12, N. Y.—F

Quad Mfg. Co., 462 N. Parkside Ave., Chicago 44, Ill.—F, IF, CH, RT, RF, T

Radex Corp., 2066 Elston Ave., Chicago 14, Ill.—IF, CH, RT, RF, T

RCA Victor Div., Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—F, IF, CH, RF

Riggs & Jeffreys, Inc., 73 Winthrop St., Newark 4, N. J.—F

Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—F

Santay Corp., 351 N. Crawford Ave., Chicago 24, Ill.—F

Saxonburg Potteries, Saxonburg, Pa.—F

Sickles Co., F. W., 165 Front St., Chicopee, Mass.—IF, CH, RF

Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—F, IF, CH, RT, RF, T

Speer Resistor Corp., Theresia St., St. Marys, Pa.—F

Standard Winding Co., 44-62 Johnes St., Newburgh, N. Y.—F, IF, CH, RT, RF, T

Stanwyck Winding Co., Newburgh, N. Y.—RF

Stockwell Transformer Corp., 295 N. State St., Concord, N. H.—IF, CH, RT, RF, T

Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.—IF, RF

S-W Inductor Co., 1056 Wood St., Chicago 22, Ill.—F, IF, CH, RT, RF, T

Synthane Corp., Oaks, Pa.—F

Taylor Fibre Co., Norristown, Pa.—F

Technical Radio Co., 275—9th St., San Francisco, Calif.—RF

Thomas & Sons Co., R., Lisbon, Ohio—F

Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—RT

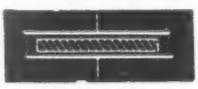
Victory Mfg. Co., 1722-24 W. Arcade Pl., Chicago 12, Ill.—F

Vokar Corp., 7300 Huron River Drive, Dexter, Mich.—IF, CH, RF

Westinghouse Elec. Corp., East Pittsburgh, Pa.—F, CH, RT

Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—CH, RT

(9) Crystals & Accessories



Crystal cartridges ..... **C**
Crystal electrodes ..... **CE**
Crystal production equipment ..... **CP**
Frequency standard ..... **F**
Holders ..... **H**
I F filter ..... **S**
Quartz crystals ..... **QC**
Rochelle salt crystals ..... **R**
Temp. control ovens ..... **T**
Tourmaline ..... **TO**
Raw quartz ..... **Q**

Aireon Mfg. Corp., Fairfax & Funston Rds., Kansas City 15, Kansas—F, H

Alden Products Co., 117 N. Main St., Brockton 64, Mass.—H

American Gem & Pearl Co., 6 West 48th St., New York 19, N. Y.—QC, TO, Q

American Jewels Corp., 94 County St., Attleboro, Mass.—C

American Time Products, Inc., 580 Fifth Ave., New York 19, N. Y.—F

Astatic Corp., Harbor & Jackson, Conneaut, Ohio—C, R

Atlas Products Corp., 30 Rockefeller Plaza, New York 20, N. Y.—C, F

Barker & Williamson, Upper Darby, Pa.—F

Bassett, Inc., Rex, 307-09-11 N.W. 1st Ave., Ft. Lauderdale, Fla.—F, QC

Bliley Electric Co., Union Station Bldg., Erie, Pa.—F, H, S, T

Bodnar Co., Charles J., 68 Marbledale Rd., Tuckahoe 7, N. Y.—"BRL"—C

BRL-Bodnar Co., Charles J.

Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—F

Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—R

Cadie Chemical Products, Inc., 621 Sixth Ave., New York 11, N. Y.—Q

Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass.—C

Commercial Crystal Co., 110-114 N. Water St., Lancaster, Pa.—C, H

Conn Ltd., C. G., 1101 E. Beardsley Ave., Elkhart, Ind.—F

Crowley & Co., Inc., Henry L., 1 Central Ave., West Orange, N. J.—C

Cryco, Inc., Box 269, South Pasadena, Calif.—H

Crystal Laboratories, 801 West Maple St., Wichita 12, Kansas.—C, F

Crystal Products Co., 1519 McGee St., Kansas City 8, Mo.—C, S, Q

Crystal Research Laboratories, Inc., 29 Allyn St., Hartford 3, Conn.—C, F, H, S, Q, QC

Crystal Research Products, Dumont, N. J.—F, T

C. W. Mfg. Co., 3800 Brooklyn Ave., Los Angeles 33, Calif.—F, H, S, Q

Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—C, F, S

Diamond Drill Carbon Co., 53-63 Park Row, New York 7, N. Y.—Q

D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—H, S

Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—F

"Eidson's," 1309 N. Second St., Temple, Texas—CE, F

Electrical Products Corp., 920 30th St., Oakland, Calif.—QC

Electro Products Laboratories, 549 W. Randolph St., Chicago 6, Ill.—F

Electronic Measurements Co., Red Bank, N. J.—CP

Electronic Mechanics, Inc., 70 Clifton Blvd., Clifton, N. J.—H

Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—C, F, S, T

Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—F

Elematic Equipment Corp., 6046 S. Wentworth Ave., Chicago 21, Ill.—CP, F, T

Elkay Radio Products, 305-309 E. Walnut St., Oglesby, Ill.—C, S

Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—C

Erco Radio Laboratories, Inc., 231 Main St., Hampstead, N. Y.—F

Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N. Y.—F

Federal Engineering Co., 37 Murray St., New York 7, N. Y.—F

Federal Telephone and Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—C, F, H, S, T

Ferris Instrument Co., 110 Cornelia St., Boonton, N. J.—F

Franklin Transformer Mfg. Co., 65 22nd Ave., N.E., Minneapolis 13, Minn.—F

Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill.—F

General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—F

General Crystal Corp., 1776 Foster Ave., Schenectady 8, N. Y.—F

General Electric Co.—Specialty Div., 1001 Wolf St., Syracuse, N. Y.—C, H

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—F, T

Gentleman Products Div. of Henney Motor Co., 1702 Cuming St., Omaha, Nebr.—F, S, Q

Gibbs & Co., Thomas B., Delavan, Wisc.—F

Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—C, F, H, T, Q

Hallicrafters Co., 2611 Indiana Ave., Chicago 16, Ill.—F

Henry Mfg. Co., 2213 Westwood Blvd., Los Angeles, Calif.—C, F, S

Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—F

Higgins Industries, Inc., 2221 Warwick Ave., Santa Monica, Calif.—C, F, S

Hipower Crystal Co., 2033 W. Charleston St., Chicago 47, Ill.—"Hipower"—F, S

Hoffman Co., P. R., 321 Cherry St., Carlisle, Pa.—CE, H, Q

Hollister Crystal Co., 1617 Pearl St., Boulder, Colo.—F, H

Holtzer-Cabot Div., of First Industrial Corp., 125 Amory St., Roxbury 19, Mass.—C

Howard Mfg. Corp., 1401 S. Main St., Council Bluffs, Iowa—H

Hunt & Sons, G. C., 133 N. Hanover St., Carlisle, Pa.—C

Instrument Glass & Mirror Co., 383 Pearl St., Brooklyn 1, N. Y.—CE

Isolantite, Inc., 343 Cortlandt St., Belleville 9, N. J. —H

Jefferson, Ray, Inc., 40 E. Merrick Rd., Freeport, L. I., N. Y.—F

Kaar Engineering Co., 619 Emerson St., Palo Alto, Calif.—C

Kilburn Glass Co. Inc., J. R., 22 S. Worcester St., Chartley, Mass.—C

Knights Co., James, Sandwich, Ill.—C, F, H, S, T, Q

Lavoie Laboratories, Matawan-Freehold Rd., Morganville, N. J.—F

Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia 44. Pa.—F

Lenoxite Division, Lenox Inc., 65 Prince St., Trenton 5, N. J.—H

Leuck Crystal Laboratory, 245 S. 11th St., Lincoln 8, Nebr.—F

Link, Fred M., 125 West 17th St., New York 11, N. Y.—C, T

Mayfair Molded Products Corp., 4440 N. Elston Ave., Chicago 30, Ill.—H

Megard Corp., 1601 S. Burlington St., Los Angeles 6, Calif.—F

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass.—F

Miller, August E., 9226 Hudson Blvd., N. Bergen, N. J.—QC

Molded Insulation Co.—Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—H

Monitor Piezo Products Co., 815 Fremont Ave., So. Pasadena, Calif.—C, F, H, S, T, Q

Monawatt Electric Corp., 66 Bissell St., Providence, R. I.—H

Mycalex Corp. of America, 60 Clifton Blvd., Clifton, N. J.—H

NA-ALD—Alden Products Co.

National Company, Inc., 61 Sherman St., Malden 48, Mass.—H, S

National Electronic Mfg. Corp., 22-78 Steinway St., Long Island City, N. Y.—H

National Gasket & Washer Mfg. Co., 122 E. 25th St., New York 10, N. Y.—H

National Scientific Products Co., 5012 N. Kedzie Ave., Chicago, Ill.—H

National Tile & Mfg. Co., 1200 E. 26th St., Anderson, Ind.—H

North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—C, F, S, Q, C

Nurnberg Thermometer Co., Inc., 112 Broadway, Cambridge 42, Mass.—T

Ogush, Inc., William B., 33 W. 60th St., New York 23, N. Y.—Q

Pacific Electronics, W. 1011-1013 First Ave., Spokane, Wash.—F

Pacific Radio Crystal Co., 1158 Sutter St., San Francisco, Calif.—QC

Peterson Radio Co., 2800 W. Broadway, Council Bluffs, Iowa—"P. R. Crystals"—F, H

Piezo Electric Products Co., 104 5th Ave., Baltimore 25, Maryland—F, S

P. R. Crystals—Peterson Radio Co.

Precision Piezo Service, 427 Mayflower St., Baton Rouge 10, La.—F, H, S, T

Premier Crystal Laboratories, Inc., 63 Park Row, New York 7, N. Y.—C, F, H, S, T, TO, Q

Publix Metal Prod. Inc., 100 Sixth Ave., New York 13, N. Y.—C, H

Quartz Laboratories, Inc., 1513 Oak, Kansas City 8, Missouri— C, Q

Radio Specialty Mfg. Co., 403 N.W. 9th St., Portland 9, Ore.—F, H, S

R. E. C. Mfg. Corp., 1250 Highland St., Holliston, Mass.—H, T

Reeves Sound Labs., Div. of Reeves-Ely Laboratories, Inc., 62 W. 47th St., New York, N. Y.—C, F, H, S, TO

Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—H

Ross Mfg. Co., 2241 S. Indiana Ave., Chicago, Ill.—H

Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—C, F, S

Shure Brothers, 225 W. Huron St., Chicago 10, Ill. —C

Standard Piezo Co., 127 Cedar St., Carlisle, Pa.—C, F, H, S

Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.—H

Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—C

Telicon Corp., 851 Madison Ave., New York 21, N. Y. —F

Trent Co., Harold E., 5005 Wilde St., Philadelphia 27, Pa.—T

Union Piezo Corp., 701 McCarter Hwy., Newark 2, N. J.—C, F, H, S

Universal Television System, 112-114 W. 18th St., Kansas City, Mo.—C

Valpey Crystal Corp., Highland St., Holliston, Mass. —C, H, S, T

V Precision Instrument Mfg. Co. Inc., 57-02 Hoffman Dr., Elmhurst, N. Y.—F

Walker, Inc., Robert, 403 W. 8th St., Los Angeles, Calif.—F, H

Westinghouse Elec. Corp., East Pittsburgh, Pa.—H

Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—C

Willson Plastics Div., Willson Magazine Camera Co., 6022 Media St., Philadelphia 31, Pa.—H

(10) Dials, Name Plates and Knobs

Call letter tabs ..... **CL**
Complete dials ..... **D**
Crystals ..... **C**
Decalcomanias ..... **DE**
Dial cables & belts ..... **DC**
Dial lamps ..... **L**
Dial light assemblies ..... **PL**
Dial locks ..... **DL**
Dial pointers ..... **P**
Drive rubbers ..... **DR**
Escutcheons ..... **E**
Faces or scales ..... **F**
Jewel pilot lights ..... **JL**
Knobs—molded ..... **KM**
Knob springs ..... **KS**
Knobs—wooden ..... **KW**
Name plates ..... **N**
Panel signal lights ..... **S**
Shaft lock ..... **SL**
Telephone dials ..... **T**
Worm drives ..... **WD**

Ace Mfg. Corp., Erie Ave., at K St., Philadelphia 24, Pa.—WD

Acme Fire Alarm Co. Inc., 106 Seventh Ave., New York 11, N. Y.—N

Acromark Co., 9-13 Morrell St., Elizabeth 4, N. J.— D, F, N, T

Aerolite Electronic Hardware Corp., 24 Cliff St., Jersey City 6, N. J.—L, PL, JL

Alden Products Co., 117 N. Main St., Brockton 64, Mass.—D, L, PL, JL, KM, S

Alpha Meter Service, 71 Nassau St., New York 7, N. Y.—F

American Dial Co. Inc., 450 W. 45th St., New York, N. Y.—F

American Emblem Co., Inc., Utica 1, N. Y.—E, N

American Insulator Corp., New Freedom, Pa.—F, KM, N

American Radio Hardware Co., 152-4 McQueston Pkwy., S., Mt. Vernon, N. Y.—"Arhco"—D, L, PL, P, DR, JL, S, SL

Ansonia Clock Co. Inc., 103 Lafayette St., New York 13, N. Y.—D

Arens Controls, Inc., 2253 S. Halsted St., Chicago 8, Ill.—KM

Arhco—American Radio Hardware Co.

Auburn Button Works, Inc., Auburn, N. Y.—KM

Austin Co., O., 335 Throop Ave., Brooklyn 21, N. Y. —D, DE, E, F, N

Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—T

Avery Adhesives, 453 E. 3rd St., Los Angeles 13, Calif.—N

Bakelite Corp., 30 E. 42nd St., New York 17, N. Y.—C

Barker & Williamson, Upper Darby, Pa.—D, DL, SL, WD

Barnes Co., Wallace, P. O. Box 1521, Bristol, Conn. —KS

Bastian Bros. Co., 1600 N. Clinton Ave., Rochester, N. Y.—DE, E, F

Bend-A-Lite Plastics Div., 423 S. Honore St., Chicago 12, Ill.—E

Berger Electronics, 109-01 72nd Rd., Forest Hills, N. Y.—DC, KM

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N. Y.—DC, KM, KW

Bostonian Process Co., 40 W. 13th St., New York 11, N. Y.—CL, F, N

Browne Electric Co., J., 3774 Surf Ave., Brooklyn 24, N. Y.—PL, JL, S

Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio "BUD"—D, PL, JL, KM, N

Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.—S

Cardy-Lundmark Co., 1801 W. Byron St., Chicago 13, Ill.—CL, PL

Carlton Lamp Corp., 730 S. 13th St., Newark 3, N. J. —L

Chicago Die Mold Corp., 4001 Wrightwood Ave., Chicago 39, Ill.—KM

Cinch Mfg. Corp., Div. United-Carr Fastener Co., 2335 W. Van Buren St., Chicago, Ill.—KS

Cleveland Plastics, Inc., 1611 E. 21st St., Cleveland 14, Ohio—KM

Colonial Brass Co., 1900 Vine St., Middleboro, Mass.—N

Control Corp., 718 Central Ave., Minneapolis 14, Minn.—N

Croname, Inc., 3701 N. Ravenswood Ave., Chicago 13, Ill.—D, C, E, F, KM, N

Crystal Laboratories, 801 West Maple St., Wichita 12, Kan.—C

Cutler-Hammer Inc., 315 N. 12th St., Milwaukee 1, Wis.—KM

Davies Molding Co., Harry, 1428 N. Wells St., Chicago 10, Ill.—CL, KM

Dial Light Co. of America, Inc., 900 Broadway, New York 3, N. Y.—PL

Diemolding Corp., Rasbach St., Canastota, N. Y.—KM

Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.— CL, D, P, F, KM, N

Drake Mfg. Co., 1713 W. Hubbard St., Chicago 22, Ill.—L, PL, JL, S

Dual Remote Control Co., 31776 Cowan Rd., Wayne, Mich.—KM

Eby Inc., Hugh H., 18 W. Chelten Ave., Philadelphia 44, Pa.—KM

Edwards, Inc., T. J., 210 South St., Boston 5, Mass.—N

Electric Coding Machine Co., 57 Franklin St., New York 13, N. Y.—F, N

Electrical Insulation Co., 12 Vestry St., New York 13, N. Y.—E, N

Electro-Marine Co., 274 Madison Ave., New York 16, N. Y.—N

Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—DL, P

Enameloid—Cloisonne—Gemloid Corp.

Erie Resistor Corp., 640 W. 12th St., Erie, Pa.— P, E, KM

Etched Products Corp., 39-01 Queens Blvd., Long Island City 4, N. Y.—D, P, E, F, N

Ever Ready Label Corp., 141-155 E. 25th St., New York 10, N. Y.—CL

Federal Screw Products Co., 224 W. Huron St., Chicago 10, Ill.—PL, JL, S

Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—D, C, N, T

G. Felsenthal & Sons, 4108 W. Grand, Chicago 51, Ill. —D, C, E, F, KM, N

Flock Process Co.—Velvetone Div., 3 Quincy St., Norwalk, Conn.—D, E

GC—General Cement Mfg. Co.

Gemlite—Gemloid Corp.

Gemloid Corp., 7910-7930 Albion Ave., Elmhurst, L. I., N. Y.—"Enameloid-Cloisonne," "Gemlite"—D, P, E, KM, N

General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—"G-C"—CL, C, DC, DL, DR, KM, KS, KW

General Electric Co., Lamp Dept., Nela Park, Cleveland 12, Ohio—L

General Electric Co.—Specialty Div., 1001 Wolf St., Syracuse, N. Y.—C, KM, S

General Electronics Mfg. Co., 2225 S. Hoover St., Los Angeles 7, Calif.—F

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—D, DL, KM, WD

Goodall Electric Mfg. Co., Third & Main St., Ogallala, Neb.—C, KM, N

Gordon Specialties Co., 823 S. Wabash Ave., Chicago 5, Ill.—D, KM, KW, N

Gothard Mfg. Co., 2114 Clear Lake Ave., Springfield, Ill.—L, PL

Grammes & Sons, Inc., L. F., 392 Union St., Allentown, Pa.—D, P, E, F, N

Greenhut Insulation Co., 31 W. 21st St., New York, N. Y.—E, F, N

Hart Mfg. Co., Hamilton St., Hartford 1, Conn.—JL, S

Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—SL

Herzog Miniature Lamp Works, 12-23 Jackson Ave., Long Island City 1, N. Y.—JL

Hopp Press, Inc., 460 W. 34th St., New York 1, N. Y.—CL, E, F, KM, N

ICA—Insuline Corp. of America

Imperial Molded Products Corp., 2925 W. Harrison St., Chicago 12, Ill.—KM

Industrial Screw & Supply Co., 717 W. Lake St., Chicago 6, Ill.—KM, KW

Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—"ICA"—CL, KM, N

International Merit Products Corp., 254 W. 54th St., New York 19, N. Y.—WD

J.F.D. Mfg Co., 4117 Fort Hamilton Parkway, Brooklyn 19, N. Y.—DC, KW

Johnson Co., E. F., Waseca, Minn.—KM

Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—E, JL, KM, KW, N, S, T

Keystone Electronics Co., 50-52 Franklin St., New York 13, N. Y.—N

Kilburn Glass Co., Inc., J. R., 22 S. Worcester St., Chartley, Mass.—C, JL

Kirkland Co., H. R., 8-10 King St., Morristown, N. J. —L, PL, N

Kopp Glass, Inc., Swissvale, Pittsburgh, Pa.—PL, JL

Kulka Electric Mfg. Co., 30 South St., Mt. Vernon, N. Y.—PL

Kurz Kasch, Inc., Dayton 1, Ohio—P, KM

Long Island Engraving Co., 19 W. 21st St., New York 10, N. Y.—E, N

McInerney Plastics Co., 25 Commerce Ave., S.W., Grand Rapids 2, Mich.—CL, D, E, N

Maico Co., Inc., 21 N. Third St., Minneapolis, 1, Minn.—KM

Mayfair Molded Products Corp., 4440 N. Elston Ave., Chicago 30, Ill.—E, KM

Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—D, F

Meyercord Co., 5323 W. Lake St., Chicago 44, Ill.—DE

Micarta Fabricators, Inc., 5324 Ravenswood Ave., Chicago 40, Ill.—PL

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass.—DL, P, KM, SL, WD

Molded Insulation Co.—Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—KM

National Co. Inc., 61 Sherman St., Malden 48, Mass. —D, DL, F, KM, SL, WD

National Lock Co., 1902 Seventh St., Rockford, Ill.— E, KM, KW, N

National Molding Co., 2141 W. Washington Blvd., Los Angeles 7, Cal.—KM

New England Electrical Works, Inc., 365 Main St., Lisbon, N. H.—DC
New Hermes Engravers, 821 Broadway, New York 3, N. Y.—E, N
New England Etching & Plating Co., 25 Spring St., Holyoke, Mass.—E, F
New England Radiocrafters, 1156 Commonwealth Ave., Boston 34, Mass.—D
Norton Laboratories, Inc., 560 Mill St., Lockport, N. Y.—KM
Pan Electronics Laboratories, Inc., 500 Spring St., N.W., Atlanta, Ga.—C
Panelyte Div., St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.—N
Parisian Novelty Co., 3510 South Western Ave., Chicago 9, Ill.—CL, D, C, P, F
Peck Spring Co., 20 Grove St., Plainville, Conn.—KS
Peerless Roll Leaf Co., Inc., 4511 New York Ave., Union City, N. J.—N
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—PL
Photox Silk Screen Supply Co., 30 Irving Pl., New York 3, N. Y.—CL, D, F, N
Pilot Industries Inc., 202 E. 44th St., New York 17, N. Y.—D
Plastic Accessories, Inc., 460 Broome St., New York 13, N. Y.—CL, D, C, P, F, N
Plastic Fabricators Co., 440 Sansome St., San Francisco 11, Calif.—CL, E, F, N
Point Mfg. Co., 5775 N. Ridge Ave., Chicago 26, Ill.—F, JL, KM
Ports Mfg. Co., 3265 E. Belmont Ave., Fresno 3, Calif.—CL, N
Premier Crystal Laboratories, Inc., 63 Park Row, New York 7, N. Y.—CL, C, L, PL, F, JL, KM, WD
Printloid, Inc., 93 Mercer St., New York 12, N. Y.—CL, D, C, P, F, N
Publix Metal Prod. Inc., 100 Sixth Ave., New York 13, N. Y.—D
Radio Craftsmen, 1341 S. Michigan Ave., Chicago 5, Ill.—DL
Reiner Electronics Co., Inc., 152 W. 25th St., New York 1, N. Y.—KM
Remler Co. Ltd., 2101 Bryant St., San Francisco 10, Calif.—KM
Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.—D
Rhodes Mfg. Co., 1753 N. Honore St., Chicago, Ill.—KM, KW
Richardson Co., 27th & Lake Sts., Melrose Park, Ill.—D, KM
R-9 Crystal Co., Inc., 907 Penn Ave., Pittsburgh, Pa.—C
Santay Corp., 351 N. Crawford Ave., Chicago 24, Ill.—E, KM, N
Saxl Instrument Co., 38-40 James St., E. Providence 14, R. I.—N
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"WALSCO"—DC, PL, DR, KS
Screenmakers, Inc., 64 Fulton St., New York 7, N. Y.—D, E, N
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—PL, P, JL, S
Shakespeare Products Co., 241 E. Kalamazoo Ave., Kalamazoo, Mich.—E, KM
Signal Indicator Corp., 894 Broadway, New York, N. Y.—PL
Silk Screen Supplies, Inc., 33 Lafayette St., Brooklyn, N. Y.—F, N, CL
Sillcocks-Miller Co., 10 W. Parker Ave., Maplewood, N. J.—D, N
Silver Co., McMurdo, 1240 Main St., Hartford, 8, Conn.—D
Slater Corp., N. G., 3 W. 29th St., New York, N. Y.—D, C, N
South Shore Radio & Electric Corp., 6815 Stony Island Ave., Chicago 49, Ill.—F, D
Standard Molding Corp., 460 Bacon St., Dayton 1, Ohio—P, E, KM, N
Standard Products Co., 505 Blvd. Bldg., Detroit 2, Mich.—CL, D, E, KM, N
Synthane Corp., Oaks, Pa.—D
Syracuse Ornamental Co., 581 S. Clinton St., Syracuse 2, N. Y.—"Syroco," "Syrocowood," "Woodite"—E, KW, N
Syroco—Syracuse Ornamental Co.
Syrocowood—Syracuse Ornamental Co.
Tingstol Co., 1461 W. Grand Ave., Chicago 22, Ill.—PL
Ton-Tex Corp., 245 Pearl St., N.W., Grand Rapids 2, Mich.—DC
Tung-Sol Lamp Works, Inc., 95 Eighth Ave., Newark 4, N. J.—L
Ucinite Co., Div. United-Carr Fastener Corp., Newtonville, Mass.—KS
United Radio Mfg. Co., 191 Greenwich St., New York N. Y.—N
U. S. Radium Corp., 535 Pearl St., New York 7, N. Y.—F
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—D
Victory Mfg. Co., 1722-24 W. Arcade Place, Chicago 12, Ill.—P, E, KM
Walsco—Walter L. Schott Co.
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—D, P, E, KM
Westinghouse Elec. Corp., East Pittsburgh, Pa.—L, JL, KM, S, SL, WD
Wickwire Spencer Metallurgical Corp., 260 Sherman Ave., Newark 5, N. J.—KS
Willson Plastics Div., Willson Magazine Camera Co., 6022 Media St., Philadelphia 31, Pa.—CL, D, DE, E, F, KM, N

(11) Drafting Room Equipment

Drafting instruments ..... DI
Drawing tables ..... DT
Drawing papers ..... D
Electric erasers ..... EE
Lighting equipment L
Pencils and accessories ..... P
Print making machines ..... BM
Sensitized papers ..... SP
Stools ..... ST
Tracing cloth ..... TC

American Photocopy Equipment Co., 2849 N. Clark, Chicago 14, Ill.—BM, SP
Arkay Laboratories Inc., 1570 S. First St., Milwaukee 4, Wis.—BM
Arkwright Finishing Co., 76 Westminster St., Providence, R. I.—TC
Art Specialty Co., 3245 W. Lake St., Chicago, Ill.—"Flexo"—L
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—L
Bruning Co., Inc., Charles, 4754 Montrose Ave., Chicago 41, Ill.— DI, DT, D, EE, L, P, BM, SP, ST, TC
Cardinell Corp., 15 Label St., Montclair, N. J.—DI, D, TC
Commercial Metal Products Co., 2251 W. St. Paul Ave., Chicago 47, Ill.—L
Dazor Mfg. Co., 4483 Duncan Ave., St. Louis 10, Mo.—L
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.—L
Joseph Dixon Crucible Co., 167 Wayne St., Jersey City 3, N. J.—P
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza So., Long Island City 1, N. Y.—L
Eagle Pencil Co., 703 E. 13th St., New York 9, N.Y.—P
Eastman Kodak Co., Rochester 4, N. Y.—SP
Eraser Co., Inc., 231 W. Water St., Syracuse 2, N. Y.—P
Faber Co., Inc., A. W., 41 Dickerson St, Newark 4, N. J.—EE, P
Faber, Eberhard, Pencil Co., 37 Greenpoint Ave., Brooklyn 22, N. Y.—P
Flexo—Art Specialty Co.
Fostoria Pressed Steel Corp., Fostoria, Ohio—L
Gates & Co., Inc., Geo. W., Hempstead Turnpike & Lucille Ave., Franklin Square, L. I., N. Y.—L
General Electric Co., Lamp Dept., Nela Park, Cleveland 12, Ohio—L
General Pencil Co, 67 Fleet St., Jersey City 6, N. J.—P
Hamilton Mfg. Co., Two Rivers, Wis.—DT
Hampden Mfg. Co., Inc., 301 E. Fourth St., Plainfield, N. J.—P
Holliston Mills, Inc., Norwood, Mass.—"Microweave"—TC
Keuffel & Esser Co., 300 Adams St., Hoboken, N. J.—DI, DT, D, EE, SP, ST, TC
Keystone Electronics Co., 50-52 Franklin St., New York 13, N. Y.—L
Larrimore Sales Co., 311 Locust St., St. Louis 2, Mo.—L
McInerney Plastics Co., 25 Commerce Ave., S.W., Grand Rapids 2, Mich.—DI
Microweave—Holliston Mills, Inc.
Ozalid Products Division, General Aniline & Film Corp., Johnson City, N. Y.—BM
Peck & Harvey, 5736 N. Western Ave., Chicago 45, Ill.—BM
Post Co., Frederick, 3650 N. Avondale, Chicago, Ill.—DT, D, EE, DI
Radio Inventions, Inc., 155 Perry St., New York, N. Y.—SP
Reliance Pencil Co., 22 S. 6th Ave., Mt. Vernon, N. Y.—P
Standard Pressed Steel Co., Jenkintown, Pa.—ST
Swivelier Co., 30 Irving Place, New York 3, N. Y.—L
Ullman Products Co., 857-61 4th Ave., Brooklyn 32, N. Y.—L
Wakefield Brass Co., F. W, Vermilion, Ohio—L
Westinghouse Electric Corp., East Pittsburgh, Pa.—L
Wheeler Reflector Co., 275 Congress St., Boston 10, Mass.—L
Wickes Brothers, Saginaw, Mich.—BM
Willson Plastics Division, Willson Magazine Camera Co., 6022 Media St., Philadelphia 31, Pa.—DI

(12) Electronic Control Equipment

(See also ELECTRONIC MEDICAL & INDUSTRIAL EQUIPMENT)

Boiler level alarms ..... B
Combustion IC
Conductivity controls CC
Counting devices C
Dimension control ..... DC
Door control ..... D
Flow control ..... F
Grading & sorting controls ..... G
Heat treating controls ..... HC
Humidity controls ..... H
Intrusion alarm ..... AS
Level control L
Lighting controls LC
Machine safety control ..... MS
Motor & generator control ..... MC
Package wrapping control ..... P
Position control ..... PC
Pressure control VC
Printing controls ..... PT
Servo amplifiers ..... SA
Servo control systems ..... SC
Servo indicating systems ..... SI
Smoke density controls ..... S
Solenoid valves ..... SV
Temperature controls ..... TC
Time controls ..... TI
Traffic ..... TR
Weight control ..... WC
Welding control ..... WE

Adam Electric Co., Frank, 3650 Windsor Place, St. Louis 13, Mo.—LC
Aerovox Corp., 740 Belleville Ave., New Bedford, Mass.—MC
Agnew Electric Co., Milford, Mich.—WE
AIC—Atomic Instruments Co.
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—C, D, LC
Alco Valve Co., 865 Kingsland, St. Louis 5, Mo.—L, SV
Allied Control Co., Inc., 2 East End Ave., New York 21, N. Y.—SV
Allis-Chalmers Mfg. Co., P. O. Box 512, Milwaukee 1, Wis.—MC
American District Telegraph Co., 155 6th Avenue, New York 13, N. Y.—AS
American Electronics Co., 1935 Whitman Ave., Butte, Mont.—TI
American Radio Co., 611 E. Garfield Ave., Glendale, Calif.—C, D, MS, TC, TI
American Time Products, Inc., 580 5th Ave., New York 19, N. Y.—MC, TI
Amglo Corp., 4234 Lincoln Ave., Chicago 18, Ill.—AC, CC, D, LC, MC, TI, TR, WE
Arrow-Hart & Hegeman Elec. Co., 103 Hawthorn St., Hartford 6, Conn.—MC
Askania Regulator Co., 1603 So. Michigan Ave., Chicago 16, Ill.—IC, F, L, MC, VC, TC, WC
ATC—Automatic Temperature Control Co., Inc.
Atomic Instrument Co., 160 Charles St., Boston, Mass.—"AIC"—C
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—DC, G, L, TI
Auth Electrical Specialty Co., Inc., 422 E. 53rd St., New York 22, N. Y.—C
Automatic Electric Mfg. Co., 10 State St., Mankato 1, Minn.—AS, TI
Automatic Products Co., 2450 N. 32nd St., Milwaukee, Wis.—SV
Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44, Pa.—"ATC"—IC, F, HC, L, VC, TC, TI
Aviometer Corp., 370 W. 35th St., New York 1, N. Y.—TI
Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10, Ohio—B, IC, F, L, S, TC
Barber-Colman Co., River & Loomis Sts., Rockford, Ill. H, L, VC, SV, TC, TI
Barker & Williamson, Upper Darby, Pa.—AS, C, DC, D, G, MS, TI
Betts & Betts Corp., 551 W. 52nd St., New York 19, N. Y.—LC
Brelco Corp., 55 Van Dam St., New York 13, N. Y.—C, G, MS, S, TI, WC
Bristol Co., Waterbury, Conn.—F, HC, H, L, VC, TC TI
Browne Electric Co., J., 3774 Surf Ave., Brooklyn 24, N. Y.—HC, MS, MC, TC, TI, WE
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—AS
Bruno-New York, Inc., Engineering Products Div., 351 4th Ave., New York 10, N. Y.—AS, C, MS, TI
Burke & James, Inc., 321 S. Wabash Ave., Chicago 4, Ill.—LC
Burling Instrument Co., 253 Springfield Ave., Newark 3, N. J.—TC
Burlington Instrument Co., North 4th St., Burlington, Iowa—MC, TI
Butte Electric & Mfg. Co., 124 Russ St., San Francisco, Calif.—AS, TR, C
Carpenter Mfg. Co., Master Light Bldg., Boston 45, Mass.—LC, TR
Carpenter Products, Inc., 85 Washburn St., Bridgeport, Conn.—WE
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio—MC, TI, WE
Clark Radio Equipment Corp., 4313 N. Lincoln Ave., Chicago 18, Ill.—C, S
Clarostat Mfg. Corp., 130 Clinton St., Brooklyn 2, N. Y.—MC
Cline Electric Mfg. Co., 4550 W. Lexington Ave., Chicago, Ill.—MC
Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.—"Fireye"—B, IC
Communications Co., Inc., 300 Greco Ave., Coral Gables 34, Fla.—TR
Conn Ltd., C. G., 1101 E. Beardsley Ave., Elkhart, Ind.—S
Conn. Tele. & Elec. Div., Great American Industries, Inc., Meriden 3, Conn.—AS

Cordox Western, Inc., 151 North Ave., Los Angeles 31, Calif.—IC

Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.—HC, MC, PC, TI, WE

Crystal Research Products, Dumont, N. J.—TC

Dalmo Victor, Div. of Goldfield Consolidated Mines Co., 1414 El Camino Real, San Carlos, Calif.—TC

Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—TC, TI

Dickson Co., 7420 Woodlawn Ave., Chicago 19, Ill.—HC, L, VC, TC

Dielectric Products Co., Inc., 125 Virginia Ave., Jersey City 5, N. J.—H

Dietz Mfg. Co, 2310 So. La Cienega Blvd., Los Angeles 34, Calif.—TC

Distillation Products, Inc., Vacuum Equipment Div., 755 Ridge Road West, Rochester 13, N. Y.—VC

Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—D, MS, PC, TR

Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—C

Drake Co., R. L., 11 Longworth St., Dayton 2, Ohio—B, IC, CC, C, DC, D, F, G, HC, H, L, LC, MS, MC, P, VC, S, TC, TI, TR, WC

Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.—F, L, SA, SC, SI

Electric Coding Machine Co., 57 Franklin St., New York 13, N. Y.—TI

Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, Ohio—WE

Electric Eye Equipment Co., 6 West Fairchild St., Danville, Ill.—C, DC, F, G, PC

Electric Furnace Co., West Wilson St., Salem, Ohio—HC

Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, Ohio—LC, MC

Electrical Industries, Inc., 42 Summer Ave., Newark 4, N. J.—WE

Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—HC, MC, TC, TI

Electrocon Corp., 219 W. Sunrise Highway, Freeport, L. I., N. Y.—TI

Electron Equipment Corp., 917 Meridian Ave., So., Pasadena, Calif.—C, MS, MC, PC, WC

Electronic Apparatus, Inc., 347 Madison Ave., New York 17, N. Y.—IC, CC, C, DC, D, L, LC, S, TI, WC, WE

Electronic Control Corp., 1573 E. Forest Ave., Detroit, Mich.—AS, IC, C, DC, D, G, MS, S, TC, TI

Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—CC, DC, F, G, H, LC, MC, BC, WC

Electronic Processes Corp., 249 Richards Road, Ridgewood, N. J.—P

Electronic Radio Alarm, Inc., 1920 Lincoln-Liberty Bldg., Philadelphia 7, Pa.—AS

Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—TC

Electronic Research & Mfg. Corp., 5805 Hough Ave., Cleveland 3, Ohio—AS, L

Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—B, CC, C, G, HC, H, LC, MS, S, TI, WE

Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—C, L

Exact Weight Scale Co., 944 5th Ave., Columbus 8, Ohio—WC

Export Industries, 53 Downing St., New York 14, N. Y.—P

Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—F, MC

Federal Instrument Co., 3609 Cernon St., Long Island City, N. Y.—B, CC, DC, MS

Fireye—Combustion Control Corp.

Fischer & Porter Co., Hatboro, Pa.—F

Fischer-Smith, Inc., 162 State St., West Englewood, N. J.—IC, CC, C, H, L, S, TC, TI

Fish-Schurman Corp., 230 East 45th St., New York 17, N. Y.—PC, TI

Fisher Pierce Co., 74 Ceylon St., Boston 21, Mass.—CC, D, L, LC, P, TC, TI

Fisher Research Laboratory, 1961 University Ave., Palo Alto, Calif.—L

Foote Pierson & Co., Inc., 75 Hudson St., Newark 4, N. J.—DC

Fractional Motors Co., 1501 N. Halsted St., Chicago 22, Ill.—MC

Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., near Loch Raven Blvd., Baltimore 4, Md.—H, TC

Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—AS, C, G, TI

General Aviation Equipment Co., Inc., 2 East End Ave., New York 21, N. Y.—MC

General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—C

General Control Co., 1200 Soldiers Field Rd., Boston 34, Mass.—C, G, LC, MS, P, S, TI

General Controls Co., 801 Allen Ave., Glendale 1, Calif.—SV, TC, TI

General Electric Co., Transmitter Div., Thompson Road Plant, Syracuse, N. Y.—HC

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—C

Geophysical Instrument Co., 1820 N. Nash St., Arlington, Va.—C, MC

Glenn-Roberts Co., 3100 E. 10th St., Oakland 1, Calif.—WE

G-M Laboratories, Inc., 4300 N. Knox Ave., Chicago 41, Ill.—LC

Hansen Co., Wm., 165 Silverbrook Ave., Niles, Mich.—AS, C, D, MS, S

Hansen Mfg. Co., R. R. No. 1, Princeton 14, Ind.—SA, SC, SI

Haydon Mfg. Co. Inc, Forestville, Conn.—C, TI

Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—AS, C, DC, G, L, MS, TI

Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—F, HC, MS, VC, SV, TC, WE

Hertner Electric Co., 12690 Elmwood Ave., Cleveland 11, Ohio—MC

Hetherington & Son, Inc., Robert, 1216 Elmwood Ave., Sharon Hill, Pa.—C, SC

Hoffman Engineering Co., 458 Sexton Bldg., Minneapolis 4, Minn.—IC, C, DC, D, G, LC, MS, P, VC, PC, S, TI

Huber Radio Co., 260 S. Center St., Casper, Wyo.—LC, TC

Industrial Instruments, Inc., 17 Pollock Ave., Jersey City, N. J.—B, CC, F, H

J-B-T Instruments, Inc., 441 Chapel St., New Haven 8, Conn.—TI

Keeney & Co., Inc., J. H., 6610 S. Ashland Ave., Chicago 36, Ill.—C, TI

Kidde & Co., Inc., Walter, 140 Cedar St., New York 6, N. Y.—VC, SV

Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—C

Kirkland Co., H. R., 8-10 King St., Morristown, N. J.—LC

Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—C, DC, LC, TC, TI

Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia 44, Pa.—IC, CC, HC, H, S, TC

Lektra Labs., Inc., 30 E. 10th St., New York 3, N. Y.—TI

Leupold & Stevens Instruments, 4445 N.E. Glisan St., Portland 13, Ore.—B, F, L, VC

Lewis Engineering Co., 52 Rubber Ave., Naugatuck Conn.—TC

Lewyt Corp., 60 Broadway, Brooklyn 11, N. Y.—C, F, VC, S

Long Co., L. J., 186 Grand St., New York 13, N. Y.—TI

Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—B, CC, C, D, F, L, LC, MS, TI

Lyman Electronic Corp., 12 Cass St., Springfield, Mass.—C, HC, MS, MC, TI, WE

Magnetic Gauge Co., High & Bartges Sts., Akron 11, Ohio—DC

Martin-Holmes, Inc., 249 Wayne Ave., Dayton, Ohio PC

McClintock Co., O. B., 139 Lyndale Ave., N., Minneapolis 3, Minn.—AS

McDonnell & Miller, 400 N. Michigan Ave., Chicago, Ill.—B

Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—C, DC, G

Megard Corp., 1601 S. Burlington Ave, Los Angeles 6, Calif.—AS, LC

Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.—B, L, VC, TC

Merrifield & Son, J. D., 609 N. 9th St., Rocky Ford, Col.—P

Mettler Co., Lee B,, 406 S. Main St., Los Angeles 13, Calif.—IC

Micro Switch Division of First Industrial Corp., Freeport, Ill.—TC

Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—C, DC, D, LC, MS, MC

Minneapolis-Honeywell Regulator Co., 2712 4th Ave., Minneapolis, Minn.—HC, MC, TC

Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—AS, MS

Moulic Specialties Co., 1005-1007 W. Washington St., Bloomington, Ill.—TC, TI

Nelson Automatic Gauge Co., 402 Oklahoma Bldg., Tulsa 3, Okla.—L

Norton Electrical Instrument Co., 85 Hilliard St., Manchester, Conn.—HC

Nurnberg Thermometer Co., Inc., 112 Broadway, Cambridge 42, Mass.—TC

Offner Electronics Inc., 5320 N. Kedzie Ave., Chicago 25, Ill.—C, DC

Operadio Mfg. Co., St. Charles, Ill.—B, TI

Paragon Electric Co., 37 West Van Buren, Chicago 5, Ill.—TI

Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.—CC, C, D, L, LC, MS, MC, P, PC, S, TI, WC

Photovolt Corp., 35 Madison Ave., New York 16, N. Y.—PC, TI

Plating Processes Corp., 109 Lyman St., Holyoke, Mass.—B, C, DC, F, HC, L, VC, SV, TC

Point Mfg. Co., 5775 N. Ridge Ave., Chicago 26, Ill.—VC, TI

Polytron Corp., 401 Broadway, New York 13, N. Y.—C, G, S, TI

Portable Products Corp., C. J. Tagliabue Div., 550 Park Ave., Brooklyn 6, N. Y.—IC, HC, H, S, TC, TI

Potter Instrument Co., 136-56 Roosevelt Ave., Flushing, N. Y.—C, P, WE

Powers Electronic & Communication Co., New St., Glen Cove, N. Y.—TI

Precision Electronics Co., 815 Washington St., Newtonville 60, Mass.—TI

Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—CC, F, L, VC, TC

Production Instrument Co., 702-20 W. Jackson Blvd., Chicago 6, Ill.—C, TI

Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.—WE

Pyrometer Instrument Co., 103 Lafayette St., New York, N. Y.—HC

Radio Frequency Laboratories, Inc., Boonton, N. J.—C, F, PC

Rectifier Engineering Co., 1809 E. 7th St., Los Angeles 21, Calif.—AS, LC

Reeves Sound Labs., Div. of Reeves-Ely Lab., Inc., 62 W. 47th St., New York, N. Y.—DC, F, PC, SC, SI

Rehtron Corp., 4313 Lincoln Ave., Chicago 18, Ill.—AS, B, IC, CC, C, D, G, HC, H, LC, MS, MC, P, PC, S, TC, TI, TR, WC

Reliance Electric & Eng. Co., Ivanhoe Rd., Cleveland 10, Ohio—MC

Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.—TI

Richardson-Allen Corp., 15 W. 20th St., New York, N. Y.—TI

Rieber, Inc., Frank, 11916 West Pico Blvd., Los Angeles 34, Calif.—TI

Riggs & Jeffrys, Inc., 73 Winthrop St., Newark 4, N. J.—TI

Robinette Co., W. C., 802 Fair Oaks Ave., South Pasadena, Calif.—MC

Rowe Radio Research Laboratory Co., 2422 N. Pulaski Rd., Chicago 39, Ill.—AS, CC, C, G, VC, TI

Rubicon Co., Ridge Ave. at 35th St., Philadelphia 32, Pa.—CC

Sarco Co., Inc., 475 Fifth Ave., New York 17, N. Y.—TC

Schulmerich Electronics, Inc., 220-228 N. Main St., Sellersville, Pa.—AS

Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill.—SV, TI, WE

Sherron Electronics Co., 1201 Flushing Ave., Brooklyn 6, N. Y.—CC, C, F, G, HC, L, TI, TR, WC, WE

Signal Engineering & Mfg. Co., 154 W. 14th St., New York 11, N. Y.—TI

Simonds Machine Co., Inc., 246-48 Worcester St., Southbridge, Mass.—MS

Smith Mfg. Co., Nathan R., 105 Pasadena Ave., South Pasadena, Calif.—SV

Special Electric Labs., 7657 S. Central Ave., Los Angeles 1, Calif.—TI

Spencer Thermostat Co., 34 Forest St., Attleboro, Mass.—TC

Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y.—SA, SC, SI

Standard Electric Time Co., 89 Logan St., Springfield 2, Mass.—C, TI

Stanley Works, New Britain, Conn.—D

Stevenson, Jordan & Harrison, Inc. (Electronic Power Co.), 19 W. 44th St., New York 18, N. Y.—WE

Stoelting Co., C. H., 424 N. Homan Ave., Chicago 24, Ill.—TI

Struthers-Dunn Inc, 1321 Arch St., Philadelphia 7, Pa.—MS, MC

Superior Electric Co., Laurel St., Bristol, Conn.—HC, LC

Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—VC

Synchro Start Products, Inc., 221 E. Cullerton St., Chicago 16, Ill.—MS, MC

Taller & Cooper, 75 Front St., Brooklyn 1, N. Y.—C, PC, SA, SC, SI, S, TI, TR, WC

Task Electronics Co., 245 W. 54th St., New York, N. Y.—IC, C, DC, D, F, MC, S

Tech Laboratories, 337 Central Ave., Jersey City 7, N. J.—H

Techno-Scientific Co., 901 Nepperhan Ave., Yonkers 3, N. Y.—TC

Teleoptic Co., 1251 Mound Ave., Racine, Wis.—TI

Teleregister Corp., 157 Chambers St., New York 7, N. Y.—C

Televiso Products, Inc., 6533 Olmstead Ave., Chicago, Ill.—DC

Tenney Engineering Inc., 26 Avenue B, Newark 5, N. J.—HC, H, TC

Thwing Albert Instrument Co., Penn St. & Pulaski Ave., Philadelphia 44, Pa.—TC

Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.—TC, TI

Trimount Instrument Co, 37 W. Van Buren, Chicago 5, Ill.—B, CC, F, L, VC

Ulanet Co., George, 413 Market St., Newark 5, N. J.—TC, TI

United Cinephone Corp., 65 New Litchfield St., Torrington, Conn.—C, D, F, G, L, LC, MS, P, S, TC, TI

United Transformer Corp., 150 Varick St., New York 13, N. Y.—LC

Universal X-Ray Products, Inc., 1800 N. Francisco Ave., Chicago 47, Ill.—C

Valverde Laboratories, 252 Lafayette St., New York 12, N. Y.—HC, TC

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio—C

Walker, Inc., Robert, 403 W. 8th St., Los Angeles 14, Calif—MC, S, TC

Wallace & Tiernan Products, Inc., Main & Mill Sts., Belleville 9, N. J.—TI

Ward Leonard Electric Co., 31 South Street, Mt. Vernon, N. Y.—LC, MC, TI

Weksler Thermometer Corp., 52 W. Houston St., New York, N. Y.—TC

Weltronic Co., 19500 W. 8 Mile Rd., Detroit 19, Mich.—MS, MC, TI, WE

Westinghouse Elec. Corporation, East Pittsburgh, Pa.—AS, B, C, DC, D, F, HC, H, L, LC, MS, MC, P, PC, S, SV, TC, TI, VC, WC, WE

Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—LC

Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.—B, MS, TC

Wilson Mfg. Co., Inc., 600 N. Andrews Ave., Ft. Lauderdale, Fla.—LC, TI

World Wide Electronics, Inc., 72 E. 13th St., New York 3, N. Y.—CC, DC, H, S

Worner Electronic Devices, 609 W. Lake St., Chicago 6, Ill.—AS, IC, C, D, LC, MS, P, PC, S, WC

Wurlitzer Co., Rudolph, Niagara Falls Blvd., North Tonawanda, N. Y.—MC
Yardeny Laboratories, Inc., 105-107 Chambers St., New York 7, N. Y.—D, PC, TC
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—C

(13) Electronic Medical & Industrial Equipment & Accessories

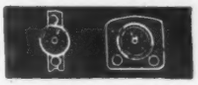
(See also ELECTRONIC CONTROL EQUIPMENT)

Anoxia photometers ..... **AP**
Audiometers ..... **A**
Cortical stimulator ..... **C**
Diathermy ..... **D**
Dielectric heating ..... **HD**
Electro-cardiograph ..... **EC**
Electro-encephalograph ..... **EE**
Electro-sedative generator ..... **EG**
Electro-shock machines ..... **S**
Electron microscopes ..... **E**
Fluoroscope screens ..... **F**
Geophysical instruments ..... **GI**
Germicidal lamps ..... **GL**
Induction heating ..... **I**
Infra-red drying equipment ..... **ID**
Internal combustion analyzers ..... **IC**
Lie detectors ..... **L**
Metal flaw detection ..... **MF**
Metal locator ..... **ML**
Meteorological trans. & rec. ..... **M**
Moisture meters ..... **MM**
Stethographs and stethophones ..... **ST**
Temperature indicators ..... **TI**
Wind velocity meter ..... **WM**
X-Ray diffraction equipment ..... **XD**
X-Ray inspection machines ..... **X**
X-Ray intensity meters ..... **XM**
X-Ray screens & filters ..... **XS**

Aero Communications, Inc., 231 Main St., Hempstead, L. I., N. Y.—HD
Aircraft X-Ray Laboratories, 1600 E. 7th St., Los Angeles 21, Calif.,—MF, XD, X
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—I
Airtronics Mfg. Co., 5145 W. San Fernando Rd., Los Angeles 26, Calif.—HD
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.—I, HD
Allis Chalmers Mfg. Co., P. O. Box 512, Milwaukee 1, Wis.—I, HD
Alnor—Illinois Testing Laboratories, Inc.
American Coil & Engineering Co., 1271 N. Hermitage Ave., Chicago 22, Ill.—HD
American Electronics Co., 1935 Whitman Ave., Butte, Mont.—ML
American Instrument Co., 8030-8050 Georgia Ave., Silver Spring, Md.—XD
American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—D, HD, GI, M, ST
Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—EC, EE, ST
Annis, R. B. Co., 1101 N. Delaware St., Indianapolis 2, Ind.—I
Associated Research, Inc., 231 S. Green St., Chicago 7, Ill.—GI, L
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—EG
Aurex Corp., 1117 N. Franklin St., Chicago, Ill.—A
Barker & Williamson, Upper Darby, Pa.—D, HD, I, GI
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—HD
Bogen, David Co., Inc., 663 Broadway, New York 12, N. Y.—D
Branston Electric Mfg. Co., 61-65 Gill Pl., Buffalo 13, N. Y.—D
Breico Corp., 55 Van Dam St., New York 13, N. Y.—I
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—GI
Budd Induction Heating, Inc., 11811 Charleveaux St., Detroit, Mich.—HD, I
Bunnell, J. H. & Co., 81 Prospect St., Brooklyn 1, N. Y.—D, I
Burdick Corp., Milton, Wise.—D, HD, EC, EG, S, ML
Burton Mfg. Co., 3855 N. Lincoln Ave., Chicago 13, Ill.—GI, GL
Cambridge Instrument Co., Inc., 3005 Grand Central Terminal, New York 17, N. Y.—ST, GI
Campbell X-Ray Corp., 2 Overland St., Boston 15, Mass.—D, HD, XO, X
Chicago Novelty Co., Inc., 1348 Newport Ave., Chicago, Ill.—GL
Cleveland Tungsten, Inc., 10200 Meech Ave., Cleveland 5, Ohio—D
Cleveland Wire Cloth & Mfg. Co., 3573 E. 78th St., Cleveland 5, Ohio—XS
Coleman Electric Co., 318 Madison St., Maywood, Ill.—AP, XM
Colloid Equipment Co., Inc., 50 Church St., New York 7, N. Y.—MM
Commercial Enclosed Fuse Co. of N. J., 1317 Willow Ave., Hoboken, N. J.—ID
Continental X-Ray Corp., 1536 N. Clybourne, Chicago, Ill.—D, X
Cover Dual Signal Systems, Inc., Div. of Electra Voice Corp., 5215-25 Ravenswood Ave., Chicago 40, Ill.—D
Crystal Research Products, Dumont, N. J.—D, S
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis—HD
Cyclonics Mfg. Co., Inc., 3906 Hudson Blvd., Union City, N. J.—HD
Cyclotron Specialties Co., Moraga, Calif.—GI
Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—EG
DeWald Radio Mfg. Corp., 440 Lafayette St., New York 3, N. Y.—M
Dillon, W. C. & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill.—ML
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—GL
Drake, E. L. Co., 11 Longworth St., Dayton 2, Ohio—A, D, HD, GI, I, L
Dumont, Allen B. Laboratories, Inc., 2 Main Ave., Passaic, N. J.—MF, ML
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza S., Long Island City 1, N. Y.—ID
Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—A, D
Ecco High Frequency Electric Corp., 7020 Hudson Blvd., North Bergen, N. J.—HD, I
Edin Electronics Co., 207 Main St., Worcester, Mass.—D, EC, EE, GL, ST
Electric Heat Control Co., 9123 Inman Ave., Cleveland 5, Ohio—IC
Electro-Medical Laboratory, Inc., Holliston, Mass.—C, EC, EE, L, ST
Electro Physical Laboratories, 45 W. 18th St., New York 11, N. Y.—EC, EE, S
Electro Products Laboratories, 549 W. Randolph St., Chicago 6, Ill.—IC
Electron Equipment Corp., 917 Meridian Ave., South Pasadena, Calif.—HD
Electronic Corp. of America, 45 W. 18th St., New York 11, N. Y.—EC, EE, S
Electronic Engrg. Service & Laboratories, 114-38 Farmers Blvd., St. Albans 12, N. Y.—A, D, ST
Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—A, C, EC, I, ID, MF, ML
Electronic Measurements Co., Red Bank, N. J.—A
Electronic Processes Corp., 249 Richards Rd., Ridgewood, N. J.—HD
Electronic Research & Mfg. Corp., 5805 Hough Ave., Cleveland 3, Ohio—HD, I, MF
Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill..—D, HD, GI, I
Electronic Sound Engineering Co., 109 N. Dearborn St., Chicago 2, Ill.—GL
Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—EC, I, ML, ST
Electronic Supply Co., 207 Main St., Worcester 8, Mass.—HD
Engineering Laboratories, Inc., 610-624 E. 4th St., Tulsa 3, Okla.—EC, GI
Eppley Laboratory, Inc., 12 Sheffield Ave., Newport, R. I.—TI
Farrand Optical Co., Inc., Bronx Blvd. & E. 238th St., New York 66, N. Y.—E
Federal Electric Co., Inc., 8700 S. State St., Chicago, Ill.—HD
Federal Telephone & Radio Corp, 200 Mt. Pleasant Ave., Newark 4, N. J.—HD, I
Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20, N. Y.—GI
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—X
Fischer, Robert A., 1720 Hillcrest Ave. Glendale 2, Calif.—D, GL, HD
Fisher Research Laboratory, 1961 University Ave., Palo Alto, Calif.—GI, ML
Fisher Scientific Co., 711 Forbes St., Pittsburgh, Pa.—ID
Fostoria Pressed Steel Corp., Fostoria, Ohio—ID
Freed Transformer Co., 72 Spring St., New York 12, N. Y.—D
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., near Loch Raven Blvd., Baltimore 4, Md.—M, WM
Garfield Medical Apparatus Co., 147 W. 22nd St., New York 11, N. Y.—D
Gates, Geo. W. & Co., Inc., Hempstead Turnpike & Lucille Ave., Franklin Sq., L. I. N. Y.—GL
Gem Radio & Television Co., 303 W. 42nd St., New York 18, N Y.—EC, I
General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—WM
General Electric Co., 1 River Road, Schenectady 5, N. Y.—I, HD
General Electric Co., Lamp Dept., Nela Park, Cleveland 12, Ohio—GL, ID
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—A
General Electric Co., Transmitter Div., Thompson Road Plant, Syracuse, N. Y.—HD, I
General Electric X-Ray Corporation, 175 West Jackson Blvd., Chicago 4, Ill.—D, EC, XD, X, XS
Geophysical Instrument Co., 1820 N. Nash St., Arlington, Va.—GI, ML, XM
G & G Precision Works, Inc., 5-33 48th Ave., Long Island City 1, N. Y.—EC
Giruler Corp., Thermex Div., 224 E. Broadway, Louisville 1, Ky.—HD
Globe Phone Mfg. Corp., 2 Linden St., Reading, Mass.—ML, ST
Gurley, W. & L. E., 514 Fulton St., Troy, N. Y.—M, WM
Hall, C. M., Lamp Co., 1035 E. Hancock Ave., Detroit 7, Mich.—ID
Hanovia Chemical & Mfg. Equipment, 233 N. J. R. R. Ave., Newark 5, N. J.—D, GL
Hart Moisture Gauges, Inc., 126 Liberty St., New York 6, N Y.—MM
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—GI
Harvey-Wells Electronics, Inc., North St., Southbridge, Mass.—HD
Hathaway Instrument Co., 1315 S. Clarkson St., Denver 10, Col.—GI
H-B Instrument Co., 2524 N. Broad St., Philadelphia, 32, Pa.—TI
Heiland Research Corp., 130 E. Fifth Ave., Denver 9, Col.—GI
Henry Mfg. Co., 2213 Westwood Blvd., Los Angeles, Calif.—HD
Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—D, GI, L, XD, XM
Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—A
Higgins Industries, Inc., 2221 Warwick Ave., Santa Monica, Calif.—D
Hoffman Engineering Corp., 458 Sexton Bldg., Minneapolis 4, Minn.—HD, S, I, MF
Huber Radio Co., 260 S. Center St., Casper, Wyo.—GL
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—HD, I
Hunt, G. C. & Sons, 133 N. Hanover St., Carlisle, Pa.—HD
Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10, Ill.—"Alnor"—ML, GI
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.—HD, I
Induction Heating Corp., 389 Lafayette St., New York 3, N. Y.—HD, I
Industrial Electronics Corp., 80 Bank St., Newark, N. J.—GL
Islip Radio Mfg. Corp., Islip, N. Y.—HD, I
Jarrell-Ash Co., 165 Newbury St., Boston 16, Mass.—XD
Johnson, E. F. Co., Waseca, Minn.—HD
Kahle Engineering Co., 1307 Seventh St., North Bergen, N. J.—HD
Kelley Koett Mfg. Co., 212 W. 4th St., Covington, Ky.—XD, X
Kluge Electronics Co., 1031 N. Alvarado St., Los Angeles 26, Calif.—HD, I
LaRose, W. T. & Associates, 635 Second Ave., Troy, N. Y.—HD
Laurehk Radio Mfg. Co., 3931 Monroe Ave., Wayne, Mich.—A, ST
Lavoie Laboratories, Matawan-Freehold Rd. Morganville, N. J.—EE, X
Lawton Products Co., Inc., 624 Madison Ave, New York 22, N. Y.—D, ML
Lektra Labs, Inc., 30 E. 10th St., New York 3, N. Y.—C, D, S
Lepel High Frequency Laboratories, Inc., 39 W 60th St., New York 23, N. Y.—HD, I
Leupold & Stevens Instruments, 4445 N. E. Glisan St., Portland, 13, Ore.—M
Liebel-Flarsheim Co., 303 W. Third St., Cincinnati 2, Ohio—D
Lincoln Electronics Corp., 653 11th Ave., New York 19, N. Y.—D, HD
Link, Fred M., 125 W. 17th St., New York 11, N. Y.—HD, I
Litton Engineering Laboratories, P. O. Box 749, Redwood City, Calif.—I
Long, L. J., Co., 186 Grand St., New York 13, N. Y.—HD, I
Lyman Electronic Corp., 12 Cass St., Springfield, Mass.—I
Magnaflux Corp., 5900 Northwest Highway, Chicago 31, Ill.—MF, ML
Magnetic Analysis Corp., 42-44 Twelfth St., Long Island City 1, N. Y.—MF, ML
Maico Co., Inc., 21 N. Third St., Minneapolis 1, Minn.—AP, A, S, L, ML, ST
Mattern, F. Mfg. Co., 4647 N. Cicero Ave., Chicago 30, Ill—XD, X
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—HD, S, I
Merit Short Wave Diathermy Co., 2758 Whittier Blvd., Los Angeles 23, Calif.—D, HD
McKesson Appliance Co., 2228 Ashland Ave., Toledo, Ohio—EC
McNeill Engineering Co., 4057 W. Van Buren St., Chicago, Ill.—S
Michigan Fluorescent Light Co., 71-77 S. Parke St., Pontiac, Mich.—GL, ID, XS
Mico Instrument Co., 80 Trowbridge St., Cambridge 38, Mass.—GI
Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—EC, ST, WM
Miller, J. W. Co., 5917 S. Main St., Los Angeles 3, Calif.—D
Miller, William Corp, 362 Colorado St., Pasadena 2, Calif.—GI
Mineralight—Ultra-Violet Products, Inc.
Miskella Infra-Red Co., East 73rd & Grand Ave., Cleveland 4, Ohio—ID

Moisture Register Co., 133 N. Garfield, Alhambra, Calif.—MM
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa., D, HD, I
Mooradian High Frequency Labs., 137 Park Pl., Bogota, N. J.—D
Moulic Specialties Co., 1005-1007 W. Washington St., Bloomington, Ill.—L
Nalco—North American Electric Lamp Co.
Newman X-Ray Corp., 518 Hankes Ave., Aurora, Ill.—X
North American Electric Lamp Co., 1014 Tyler St., St. Louis 6, Mo.—"Nalco"—ID
North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—XD, X
Norton Electrical Instrument Co., 85 Hilliard St., Manchester, Conn.—TI
Northwest Syndicate, Inc., 711 St. Helens Ave., Tacoma 1, Wash.—D, HD
Offner Electronics, Inc., 5320 N. Kedzie Ave., Chicago 25, Ill.—EE, S
Ohio Crankshaft Co., Tocco Div., 3800 Harvard Ave., Cleveland 1, Ohio—I, HD
Operadio Mfg. Co., St. Charles, Ill.—HD
Parker Engineering Products Co., 16 W. 22nd St., New York, N. Y.—HD, L
Peerless Laboratories, 467 10th Ave., New York 18, N. Y.—D, X
Picker X-Ray Corp., 300 Fourth Ave., New York 10, N. Y.—XD, X, XM, XS
Polk Electronics, 119 Bleeker St., New York 12, N. Y.—D, HD, I
Professional Tool & Engineering Co., 615 S. Peoria St., Chicago, Ill.—XM, XS
Radio Craftsmen, 1341 S. Michigan Ave., Chicago 5, Ill.—HD
Radio Frequency Laboratories, Inc., Boonton, N. J. —GI, IC, ML
Radio Receptor Co., Inc., 251 W. 19th St., New York 11, N. Y.—HD
Rahm Instruments, Inc., 12 W. Broadway, New York 7, N. Y.—C, EC, EE, EG, S, ST
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—D, HD, I, X
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—HD, E, I, ML
Rehtron Corp., 4313 Lincoln Ave., Chicago 18, Ill.—ML
Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—HD
Ritter Co., Inc., Rochester 3, N. Y.—X
Robinson-Houchin Optical Co., 79 Thurman Ave., Columbus 6, Ohio—A, ST
Rogers Diesel & Aircraft Corp., 1120 Leggett Ave., New York 59, N. Y.—I
Rowe Radio Research Laboratory Co., 2422 N. Pulaski Rd., Chicago 39, Ill.—GI, MF, ML, WM
Safety Electric Co., 110 S. Dearborn St., Chicago 3, Ill.—D, GL
St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City 1, N. Y.—XD, X, XS
Sanborn Co., 39 Osborn St., Cambridge 39, Mass.—EC
Saxl Instrument Co., 38-40 James St., East Providence 14, R. I.—GI, WM
"S" Corrugated Quenched Gap Co., Scientific Electric Div., 107 Monroe St., Garfield, N. J.—I, HD
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—HD, I
Shakeproof, Inc., 2501 N. Keeler Ave., Chicago 39, Ill.—HD
Sherron Electronics Co., 1201 Flushing Ave., Brooklyn 6, N. Y.—HD
Smith, Nathan R. Mfg. Co., 105 Pasadena Ave., South Pasadena, Calif.—D
Sonotone Corp., Saw Mill River Rd., Elmsford, N. Y.—A
Sperry Products, Inc., 15th & Willow Ave., Hoboken, N. J.—MF
Standard Engineering Laboratories, 40 S. Oak Knoll Ave., Pasadena 1, Calif.—D, HD, I
Sterilaire—Ultra-Violet Products, Inc.
Stevens Arnold Co., 22 Elkins St., South Boston, Mass.—HD, I
Stoelting, C. H. Co., 424 N. Homan Ave., Chicago 24, Ill.—L
Stokes, F. J. Machine Co., 6054 Tabor Rd., Philadelphia 20, Pa.—HD
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—HD
Terma Electric Co., 20 W. 22nd St., New York, N. Y.—D, I
Thermionic Engineering Corp., 32 W. 12th St., Bayonne, N. J.—D, HD, EC, EE
Thompson, John E. Co., 1440 W. 47th St., Chicago 9, Ill.—D, HD, I
Transmitter Equipment Mfg. Co., Inc., 345 Hudson St., New York 14, N. Y.—D, EE, S, HD
Trimount Instrument Co., 37 W. Van Buren, Chicago 5, Ill.—GI
Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.—ID
Ultra-Violet Products, Inc., 5205 Santa Monica Blvd., Los Angeles 27, Calif.—"Sterilaire"—"Mineralight" —GL, MF
United Electronics Co., 42 Spring St., Newark 2, N. J. —D, HD, I
U. S. Television Mfg. Corp., 3 W. 61st St., New York 23, N. Y.—D
Universal X-Ray Products, Inc., 1800 N. Francisco Ave., Chicago 47, Ill.—L, X, HD
Vacolite Co., 3001-3003 N. Henderson, Dallas, Tex.—A
Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio—X, XM
Weltronic Co., 19500 W. Eight Mile Rd., Detroit 19, Mich.—I, HD
Western Geophysical Co., 601 W. 5th St., Los Angeles 11, Calif.—GI
Westinghouse Electric Corp., 300 W. Baltimore St., Baltimore 3, Md.—I, HD
Westinghouse Electric Corp., East Pittsburgh, Pa.—D, HD, F, GL, I, ID, MF, XD, X, XM, XS
White Research, 899 Boylston St., Boston, Mass.—GI
Wholesale Radio Laboratories, 782 Commonwealth Ave., Boston, Mass.—X
World Wide Electronics, Inc., 72 E. 13th St., New York 3, N. Y.—D, HD, EC, EE, S, GL, I, MF, ML
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St, York, Pa.—D, GL

(14) Flexible Shaft Controls



Control units (complete) ..... CU
Control heads ..... CH
Fittings ..... F
Flexible shafts ..... FS

Aeronautical Radio Mfg. Co., 155 First St., Mineola, L. I., N Y.—CU, CH, F, FS
Arens Controls, Inc., 2253 S. Halsted St., Chicago 8, Ill.—CU
Barco Mfg. Co., 1801 Winnemac, Chicago 40, Ill.—F
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—FS
Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, North Hollywood, Calif.—CH
Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio—FS
Chicago Metal Hose Corp., Maywood, Ill.—F
Croname, Inc., 3701 N. Ravenswood Ave., Chicago 13, Ill.—CU, CH, F, FS
Foote Bros., Gear & Machine Corp., 5225 S. Western Blvd., Chicago 9, Ill.—F
Fuchs, Charles A., 13-15 Mollineaux Place, Roosevelt, L. I., N. Y.—F
Gussack Machined Products Co., 10-20 45th Rd., Long Island City 1, N. Y.—CU, F
J. F. D. Mfg. Co., 4111 Ft Hamilton Parkway, Brooklyn 19, N. Y.—FS
Lord Mfg. Co. 1635 W. 12th St., Erie, Pa.—FS
National Co., Inc., 61 Sherman St., Malden 48, Mass.—CU, CH, F, FS
Piezoelectric Corp., 110 E. 42nd St., New York 17, N. Y.—CH
Shakespeare Products Co., 241 E. Kalamazoo Ave., Kalamazoo, Mich.—CH, F, FS
Stewart Mfg. Corp., F. W., 4311-13 Ravenswood Ave., Chicago 13, Ill.—CU, CH, F, FS
Stow Mfg. Co., Binghamton, N. Y.—CU, CH, F, FS
Walker-Turner Co., Inc., 639 South Avenue, Plainfield, N. J.—CU, CH, F, FS
Waterproof Electric Co., 72 E. Verdugo Ave., Burbank, Calif.—F
White Dental Mfg. Co., S. S. Industrial Div., 10 E. 40th St., New York, N. Y.—FS

(15) Hand Tools

Alignment tools ..... AT
Chassis holders ..... CH
Demagnetizers ..... DM
Drills, electric ..... D
Electric etchers ..... EE
Electroplater ..... E
Flux, fluid ..... SF
Flux, paste ..... SP
Gages ..... G
Hand micrometers ..... HM
Hacksaw blades ..... HB
Hammers, plastic ..... H
Hand drills ..... HD
Hole cutters ..... HC
Inspection lenses L
Inspection mirrors ..... M
Knob puller ..... KP
Pliers ..... P
Punches ..... PU
Ratchet wrenches ..... RW
Scales & tapes ..... SA
Screwdrivers ..... SD
Side cutters ..... SC
Socket wrenches ..... SW
Solder ..... S
Soldering irons ..... SI
Soldering iron stands ..... SS
Soldering iron tips ..... SE
Solder pots ..... ST
Staple driver ..... SH
Twist drills ..... T
Tube pin straightener ..... TS
Tube pullers ..... TP
Wire strippers ..... WS
Vises V

Aarons Radio Corp., 125 E. 46th St., New York 17, N. Y.—CH, HM, SI
Ackermann, Steffan & Co., 4532 Palmer St., Chicago, Ill.—HB
Acromark Co., 9-13 Morrell St., Elizabeth 4, N. J.—PU
Acro Tool & Die Works, 4554 Broadway, Chicago 40, Ill.—CH
Aeroil Products Co., 5701 Park Ave., West New York, N. J.—ST
Aerolite Electronic Hardware Corp., 24 Cliff St., Jersey City 6, N. J.—AT
Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1, N Y—S
American Beauty—American Electrical Heater Co.
American Electrical Heater Co., 6110 Cass Ave., Detroit 2, Mich.—"American Beauty"—SI, SS, SE
American Radio Hardware Co., 152-4 MacQuesten Pkwy. S., Mt. Vernon, N. Y.—"Arhco"—AT, SD
American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, Pa.—SF, SP, S
Annis Co., R. B., 1101 N. Delaware St., Indianapolis 2, Ind.—DM, EE
Arhco—American Radio Hardware Co.
Austin Co., M. B., 108-116 S. Desplaines St., Chicago 6, Ill.—HB, SD
Baker Electronic Mfg. Co., 2816 Aldrich Ave. S., Minneapolis 8, Minn.—"Flash"—SF, SD, SI, SE
Baker Phillips Co., 1624 Chicago Ave. S., Minneapolis, Minn.—SI, SE
Bausch & Lomb Optical Co., Rochester 2, N. Y.—L
Belmont Smelting & Refining Works, 330 Belmont, Brooklyn 7, N. Y.—S
Billings & Spencer Co., 1 Laurel, Hartford 6, Conn.—"Billings"—AT, P, RW, SW, V
Black & Decker Mfg. Co., E. Pennsylvania Ave., Towson 4, Md—D, HC, SD
Bristol Co., Waterbury 91, Conn.—SW
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.—SP, HB, S
Burgess Battery Co., Handicraft Div., Vibro Tool Dept., 180 N. Wabash Ave., Chicago 1, Ill.—EE
Chicago Tool & Engineering Co., 8383 S. Chicago Ave., Chicago 17, Ill.—V
Clark Electric Co., James Jr., 600 Bergman St., Louisville 2, Ky.—D, SD
Clark Co., Robert H., 9330 Santa Monica Blvd., Beverly Hills, Calif. —HC
Cole Radio Works, 86 Westville Ave., Caldwell, N. J.—SI, SS
Despatch Oven Co., 619 S. E. Eighth St., Minneapolis 14, Minn.—ST
Detroit Power Screw Driver Co., 2801 W. Fort St., Detroit, Mich.—SD
Disston & Sons, Inc., Henry, Tacony, Philadelphia 35, Pa.—HB, SD
Division Lead Co., 836 W. Kinzie St., Chicago 22, Ill.—SF, SP, S, WS
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—D, HD, SH
Drake Electric Works, Inc., 3654 Lincoln Ave., Chicago 13, Ill.—SI, SS, SE, ST
Dual Remote Control Co., 31776 Cowan Rd., Wayne, Mich.—SI
Eagle Electric Mfg. Co. Inc., 23-10 Bridge Plaza S., Long Island City 1, N. Y.—SI
Electric Soldering Iron Co., Inc., W. Elm St., Deep River, Conn.—"Esico"—SI, SS, SE, ST
Electro Mag. Mfg. Co., 610 N. Rockford Ave., Rockford, Ill.—EE
Eraser Co., Inc., 231 W. Water St., Syracuse 2, N Y.—WS
Esico—Electric Soldering Iron Co. Inc.
Etched Products Corp., 39-01 Queens Blvd., Long Island City 4, N. Y.—SA
Fairmount Tool & Forging Co., 10611 Quincy Ave., Cleveland, Ohio—P, SD, SW
Farrelloy Co., 1243-45 N. 26th St., Philadelphia 21, Pa.—SF, SP, S
Federal Screw Products Co., 22 W. Huron St., Chicago 10, Ill.—SW, SE
Flash—Baker Electronic Mfg. Co.
Forsberg Mfg. Co., 85 Walker St., Bridgeport, Conn.—HB, HD, SD
Fuchs, Charles A. 13-15 Mollineaux Pl., Roosevelt, L. I. N Y.—PU
Gardiner Mfg. Co., 2711 Union St., Oakland 7, Calif.—AT, HC, PU, RW, SD, SW, SI, SS, SE, SH
Gardiner Metal Co., 4820 S. Campbell Ave., Chicago 32, Ill.—S
GC—General Cement Mfg. Co.
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—AT, CH, SP, KP, SW, TP, WS
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—SI

Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn 27, N. Y.—SF, SP, S, SI
Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—DM, EE, SI, ST
Greenlee Tool Co., 12th St. & Columbia Ave., Rockford, Ill.—HC, PU, SD
Groves Corp., 42 N. Sprigg St., Cape Girardeau, Mo.—S
Handy & Harmon, 82 Fulton St., New York 7, N. Y.—SP
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—DM
Hexacon Electric Co., 161 W. Clay Ave., Roselle Park, N. J.—SI, SS, SE
ICA—Insuline Corp. of America
Ideal Industries, Inc., 5194 Park Ave., Sycamore, Ill.—DM, SI, WS
Industrial Screw & Supply Co., 717 W. Lake St., Chicago 6, Ill.—HB, S
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—AT, HC, PU, SD, SW, SI, SS, SE
Intex Co., 303 W. 42nd St., New York 18, N. Y.—D, EE, HM, HB, HD, T, V
Jones Motrola Corp., 432 Fairfield Ave., Stamford, Conn.—D
Kellems Co., Saugatuck, Conn.—TP
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—SF, SP, P, SD, S, SI, SS, SE, ST, WS
Kelnor Mfg. Co., 703 Market St., San Francisco 4, Calif.—SI
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.—SF, SP, S, SS
Keystone Electronics Co., 50-52 Franklin St., New York 13, N. Y.—AT
Kollath Mfg. Co., 4601 W. Addison St., Chicago, Ill.—SI, SS, SE, ST
Kraeuter & Co., Inc., 563 18th Ave., Newark, N. J.—P, PU
Larrimore Sales Co., 311 Locust St., St. Louis 2, Mo.—L, M
Lead-All Products Co., 24 E. 21st St., New York 10, N. Y.—WS
Lectrohm Inc., 5125 W. 25th St., Cicero 50, Ill.—"Lectrohm"—ST
Linick, Leslie L., 29 E. Madison St., Chicago, Ill.—E, SF, SD, S
Link, Fred M., 125 W. 17th St., New York, N. Y.—TP
Lufkin Rule Co., 1730 Hess Ave., Saginaw, Mich.—HM, SA
Luma Electric Equipment Co., P. O. Box 132, Toledo 1, Ohio—DM, EE, SI
Magnaflux Corp., 5900 Northwest Highway, Chicago 31, Ill.—DM
Martindale Electric Co., Box 617, Edgewater Br., Cleveland 7, Ohio—EE
Morse Twist Drill & Machine Co., 163 Pleasant St., New Bedford, Mass.—T
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—TP
New England Etching & Plating Co., 25 Spring St., Holyoke, Mass.—SA
N. J. Jewelers Supply, 280 Plane St., Newark 2, N. J.—P
New York Solder Co., 15 Crosby St., New York, N. Y.—S
Park Metalware Co., Inc., Bank St., Orchard Park, N. Y.—AT, H, P, SD, SC, SW
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.—PU, S
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—AT
Phonograph Needle Mfg. Co., Inc., 42-46 Dudley St., Providence 5, R. I.—SD
Pratt & Whitney, Div. of Niles-Bement-Pond Co., West Hartford, Conn.—G
Pyramid Products Co., 2224 S. State St. Chicago, Ill.—WS
Rajah Co., 53 Locust Ave., Bloomfield, N. J.—P
Rapid Electroplating Process, Inc., 1414 S. Wabash Ave., Chicago 5, Ill.—E
Richmond, Inc., 2810 E. 11th St., Los Angeles 23, Calif.—SD
Ruby Chemical Co., 68-70 McDowell St., Columbus 8, Ohio—"Rubyfluid"—SF, SP, S
Rubyfluid—Ruby Chemical Co.
George Scherr Co., Inc.,, 200 Lafayette St., New York 12, N. Y.—L
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"Walsco"—AT, SW, SH
Simonds Machine Co., Inc., 246-48 Worcester St., Southbridge, Mass.—SC
Skyway Precision Tool Co., 3217 Casitas Ave., Los Angeles 26, Calif.—RW
Small Motors, Inc., 1322 Elston Ave., Chicago 22, Ill.—D
Smith Mfg. Co., Nathan R., 105 Pasadena Ave., S. Pasadena, Calif.—DM
Sound Equipment Corp., 3903 San Fernando Rd., Glendale 4, Calif.—SI, SS, SE, ST
Special Chemicals Co., 30 Irving Pl., New York 3, N. Y.—S
Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—P
Speedway Mfg. Corp., 1834 S. 52nd Ave., Cicero 50, Ill.—D
Sperman Metal Specialties, 2199 E. 21st St., Brooklyn 29, N. Y.—DM
Standard Molding Corp., 460 Bacon St., Dayton 1, Ohio—SD
Standard Pressed Steel Co., Jenkintown, Pa.—SW
Stanley Works, New Britain, Conn.—D, H, HD, HC, PU, SD, SI, SS, SE, T
Star Expansion Products Co., 147 Cedar St., New York 6, N. Y.—TS
Sta-Warm Electric Co., 333 N. Chestnut St., Ravenna, Ohio—ST
Stedman, Robert L., E. Main St., Oyster Bay, N. Y.—CH, TS
Stevens Walden, Inc., 475 Shrewsbury St., Worcester 4, Mass.—AT, HC, P, PU, RW, SD, SW
Stow Mfg. Co. Inc., Binghamton, N. Y.—D
Superior Flux Co., 913 Public Square Bldg., Cleveland 13, Ohio—SF, SP
Technical Radio Co., 275 9th St., San Francisco, Calif.—SI
Trent Co., Harold E., 5005 Wilde St., Philadelphia 27, Pa.—ST
Tuck Mfg. Co., 74 Ames St., Brockton 39, Mass.—SD
Tungsten Contact Mfg. Co., 7311 Cottage Ave., N. Bergen, N. J.—C, M
Tweezer-Weld Corp., 280 Plane St., Newark 2, N. J.—SI
Ullman Products Co., 857-61 Fourth Ave., Brooklyn 32, N. Y.—DM, L, M
Ungar Electrical Tools, Inc., 611 Ducommon St., Los Angeles, Calif.—SI
U. S. Electrical Tool Co., 1050 Findlay St., Cincinnati 41, Ohio—D
Utica Drop Forge & Tool Corp., 2415 Whitesboro St., Utica 4, N. Y.—RW, SC
Vaco Products Co., 317 E. Ontario St., Chicago, Ill.—SD, SW
Volynsky Mfg. Co., Inc., Boris M., 311 W. 66th St., New York 23, N. Y.—AT
Vulcan Electric Co., Danvers 10, Mass.—SI
Walsco— Walter L. Schott Co.
Weaver Specialty Co., 6344 Aurelia St., Pittsburgh 6, Pa.—SP
Weller Mfg. Co., 516 Northampton St., Easton, Pa.—SI
Westinghouse Elec. Corp., E. Pittsburgh, Pa.—SF, S, ST
World Wide Electronics, Inc., 72 E. 13th St., New York 3, N. Y.—DM
Wynn Mfg. Div., Hudson Supply Co., 401 N. 27th St., Richmond 23, Va.—AT, SE

(16) Hardware—Connectors and Miscellaneous Parts

Binding posts	BP
Cable clamps	CC
Cable connectors	C
Clips, spring	SC
Coaxial cable fittings	CF
Coil shields	CS
Contact points	CM
Couplings	CP
Fasteners	FA
Fuses	F
Fuse holders	FH
Gaskets	GA
Gears	GE
Grid clips	GC
Grommets	G
Hinges, cabinet hdwe.	H
Jacks	J
Mounting brackets	MB
Nuts	N
Nuts, lock and self-locking	NL
Pilot light assemblies	PL
Plugs	P
Retaining rings	RR
Rivets	R
Safety terminals	STE
Screws	S
Self-tapping screws	SS
Set screws	ST
Shielding, rubber	SR
Shockproof mounts	SM
Soldering lugs	SL
Solderless lugs	L
Solderless links	LI
Solderless pins	PS
Springs	SP
Strain reliefs	ST
Terminals	TE
Terminals, hermetic	TH
Terminal strips	T
Tube shields	TS
Tube clamps	TC
Tube connectors	TB
Tube sockets	SKT
Washers, brass	WB
Washers, felt	WF
Washers, fibre	FW
Washers, lock	WL
Washers, plastic	WP
Washers, rubber	WR

Aarons Radio Corp., 125 E. 46th St., New York 17, N. Y.—J, SM
A.B.C. Products, Inc., 2131 Stoner Ave., W. Los Angeles 25, Calif.—C, J, P
Accurate Spring Mfg. Co., 3811 W. Lake St., Chicago 24, Ill.—SP
Ace Mfg. Corp., Erie Ave. at K St., Philadelphia 24, Pa.—BP, SC, CS, J, MB, STE, TE, T, TS, WB, GE
Adaptol Co., 260 Utica Ave., Brooklyn 13, N. Y.—TB
Aero Electric Corp., 6916 Romaine St., Los Angeles 38, Calif.—CC, C, CF
Aerolite Electronic Hardware Corp., 24 Cliff St., Jersey City 6, N. J.—CC, FH, GC, G, J, MB, P, STE, S, SS, SL, TE, T, FW
Aircraft-Marine Products, Inc., 1523 N. 4th St., Harrisburg, Pa.—L, PS, TE, T, TC, TB
Aircraft Screw Products Co., Inc., 47-23 35th St., Long Island City 1, N. Y.—STE, S
Air-Shields, Inc., County Line Road, Hatboro, Pa.—CS, CM
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—C, FH, P, SR, ST, SKT
Allegheny Ludlum Steel Corp., Brackenridge, Pa.—CS, TS
Allmetal Screw Products Co., 33 Greene St., New York 13, N. Y.—NL, N, R, SS, S, WL
All-Steel Equipment Co., 723 Griffith Ave., Aurora, Ill.—CC, C, CP
All Weather Springs, 140 Cedar St., New York, N. Y.—SP
Aluminum Goods Mfg. Co., 1512 Washington St., Manitowoc, Wis.—CS, TS
Amalgamated Radio Television Corp., 476 Broadway, New York 13, N. Y.—J, P, T, SKT
American Brass Co., 414 Meadow St., Waterbury 88, Conn.—C, SC, GC, G, SL, TE, TS, WB
American Communications Corp., 306 Broadway, New York, N. Y.—BP
American Electronics Co., 216 Centre St., New York 13, N. Y.—CC, C, SC, CM, CP, FH, GA, GC, H, J, MB, P, RR, SL, L, LI, PS, SP, TE, T, TC, SKT, WB, FW, WP
American Materials Co., 150 Nassau St., New York 7, N. Y.—R
American Nut & Bolt Fastener Co., 2029 Doerr St., Pittsburgh 12, Pa.—WB, WL
American Phenolic Corp., 1830 S. 54th St., Cicero, Ill.—"Amphenol"—C, CF
American Radio Hardware Co., 152-4 MacQueston Pkwy. S., Mt. Vernon, N. Y.—BP, CC, C, SC, CP, GC, G, J, N, MB, NL, P, RR, R, STE, S, SS, SL, L, SP, TE, T, TC, SKT, WB, WF, FW, WL, WP, WR
American Screw Co., 21 Stevens St., Providence, R. I.—S, SS
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, Ohio—SP
Amphenol—American Phenolic Corp.
Arens Controls, Inc., 2253 S. Halsted St., Chicago 8, Ill.—CC, G
Arkay Diecutting Co., 73 James St., New York 2, N. Y.—GA
Armstrong Cork Co., Lancaster, Pa.—GA
Aro Equipment Corp., Enterprize & Trevitt, Bryan, Ohio—WR
Arrow-Hart & Hegeman Elec. Co., 103 Hawthorn St., Hartford 6, Conn.—P, T
Art Wire & Stamping Co., 227 High St., Newark 2, N. J.—SP
Astatic Corp., Cor. Harbor & Jackson Sts., Conneaut, Ohio—CF
Atlantic Screw Works, Inc., Hartford, Conn.—S
Atlas Products Corp., 30 Rockefeller Plaza, New York 20, N. Y.—CC, C, P, SL, L, TE
Austin Co., M. B., 108-116 S. Desplaines St., Chicago 6, Ill.—CC, C, NI
Baer Co., N. S., 9-11 Montgomery St., Hillside, N. J.—GA, T, FW, WP
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.—CM
Barker & Williamson, Upper Darby, Pa.—C, CF, CP, GC, J, N, P, SL, TC, SKT
Barnes Co., Wallace, P. O. Box 1521, Bristol, Conn.—SP
Bead Chain Mfg. Co., 110 Mt. Grove St., Bridgeport 5, Conn.—J, PS, TE
Beaver Gear Works, Inc., 1025 Parmele St., Rockford, Ill.—GE
Bendix Radio Div., of Bendix Aviation Corp., E. Joppa Rd., Baltimore 4, Md.—SM
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N. Y.—CC, C, SC, CP, J, NL, N, P, S, SS, SL, PS, TE, T, TC, SKT, WB, WL
Birtcher Corp., 5087 Huntington Dr., Los Angeles 32, Calif.—TC
Boots Aircraft Nut Corp., New Canaan, Conn.—NL
Bowser, Inc., Terryville, Conn.—S
Brainin Co., C. S., 233 Spring St., New York 13, N. Y.—CM
Bristol Co., Waterbury 91, Conn.—S, ST
Brown Engineering Co., 4635 S. E. Hawthorne Blvd., Portland 15, Ore.—BP, CM, G
Browne Electric Co., J., 3774 Surf Ave., Brooklyn 24, N. Y.—F, FH
Buchmann Spark-Wheel Corp., 4-20 47th Ave., Long Island City 1, N. Y.—BP, C, CF, CM, CP, NL, N P, STE, S, TE, WB
Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio—BP, GC, J, P, SL, L, TE, T, TS, SKT
Buonie & Co., H. H., 2141 Madison Ave., Toledo 1, Ohio—CC, C, CF, CM, GA, G, WR
Burke Electric Co., 12th & Cranberry, Erie, Pa.—TE, T
Burndy Engineering Co., Inc., 107 Bruckner Blvd., New York 54, N. Y.—L, LI, TE, T
Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo.—"Buss"—F, FH
Callite Tungsten Corp., 540 39th St., Union City, N. J.—CM
Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass.—SL, T
Camloc Fastener Corp., 420 Lexington Ave., New York 17, N. Y.—NI,
Cannon Co., C. F., Springwater, N. Y.—CP

Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.—CC, C, CF, TE, T
Cardwell Mfg. Corp., Allen D., 81 Prospect St., Brooklyn 1, N. Y.—CP, MB
Carter Radio Division, Precision Parts Co., 213 Institute Place, Chicago 10, Ill.—J, P
Central Screw Co., 3501 Shields Ave., Chicago 9, Ill.—N, R, S, SS
Chancellor Products Corp., 1475 Chardon Road, Cleveland, Ohio—S
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.—BP, C, SC, FH, G, N, R, S, WB
Cherry Rivet Co., 231 Winston St., Los Angeles 13, Calif.—R
Chicago Rivet & Machine Co., 9600 W. Jackson Blvd., Bellwood, Ill.—R
Chicago Tool & Engineering Co., 8383 S. Chicago Ave., Chicago 17, Ill.—C
Cinch Mfg. Corp., Div. United Carr Fastener Co., 2335 W. Van Buren St., Chicago, Ill.—GC, J, MB, SM, SL, L, TE, T, TS, TC, SKT
Cincinnati Electric Products, Carthage at Hannaford, Norwood, Cincinnati 12, Ohio—T
Cleveland Tungsten, Inc., 10200 Meech Ave., Cleveland 5, Ohio—CM
Cline Electric Mfg. Co., 4550 W. Lexington Ave., Chicago, Ill.—T
Columbia Nut & Bolt Co., Inc., Bridgeport, Conn.—N
Columbia Wire & Supply Co., 4106 N. Pulaski Rd., Chicago 41, Ill.—P
Commercial Enclosed Fuse Co. of N. J., 1317 Willow Ave., Hoboken, N. J.—F
Communication Products, Inc., Route 36, Palmer Ave., Keansburg, N. J.—CF
Conn, Ltd., C. G., 1101 E. Beardsley Ave., Elkhart, Ind.—NL
Connecticut Telephone & Electric, Div. of Great American Industries, Inc., Meriden, Conn.—J, T
Connector Div., International Resistance Co., 401 N. Broad St., Philadelphia, Pa.—C, CF, P
Continental Screw Co., 459 Mt. Pleasant St., New Bedford, Mass.—BP, N, S, SS
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—J, TE, T
Corbin Screw Division, American Hardware Corp., High, Myrtle & Grove Sts., New Britain, Conn.—N, S, SS, WB
Cords Ltd., Inc., 26 Camp St., Newark 5, N. J.—CC, C, CF, P, SR, ST
Corning Glass Works, Corning, N. Y.—SKT
Creative Plastics Corp., 963 Kent Ave., Brooklyn 5, N. Y.—G, T, WP
Crowley & Co., Inc., Henry L., 1 Central Ave., West Orange, N. J.—CF, T, SKT
Curtis Development & Mfg. Co., 3266 N. 33rd St., Milwaukee 10, Wis.—TE, T
De Mornay-Budd, Inc., 475 Grand Concourse, New York 51, N. Y.—CF
Diamond Instrument Co., North Avenue, Wakefield, Mass.—C, CF, CM
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—CC, C, H
Duflex—Harris Products Co.
Dzus Fastener Co., Inc., John St., Babylon, N. Y.—NL
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza S., Long Island City 1, N. Y.—F
Eastern Specialty Co., 3617 N. 8th St., Philadelphia 40, Pa.—BP, C, SL, L, TE
Eby Inc., Hugh H., 18 W. Chelten Ave., Philadelphia 44, Pa.—C, J, P, T, SKT
Eitel-McCullough, Inc., San Bruno, Calif.—CP
Elastic Stop Nut Corp. of America, 2330 Vauxhall Road, Union, N. J.—NL
Electrical Industries, Inc., 42 Summer Ave., Newark 4, N. J.—TH
Electrix Corp., 150 Middle St., Pawtucket, R. I.—P
Electro-Marine Co., 274 Madison Ave., New York 16, N. Y.—CC, CF, GA, SL
Electronic Mfg. Co., 339-347 W. 8th Ave., Dubuque, Iowa—TE, T, SKT
Electronic Plumbing Corp., 311 Nepperhan Ave., Yonkers 2, N. Y.—CF
Electronic Supply Co., 207 Main St., Worcester 8, Mass.—MB
Englewood Electrical Supply Co., 5801 S. Halsted St., Chicago, Ill.—C
Ericsson Screw Machine Products Co., Inc., 25 Lafayette St., Brooklyn 1, N. Y.—N, P, RR, R, S
Everlock—Thompson Bremer & Co.
Faber, Merle F., 35 Stillman St., San Francisco, Calif.—TB, GC
Fansteel Metallurgical Corp., 2200 Sheridan Rd., North Chicago, Ill.—CM
Federal Screw Products Co., 224 W. Huron St., Chicago 10, Ill.—CC, CM, FH, GC, G, NL, MB, N, R, S, SS, SM, SL, TE, T, WB, FW, WL, WR
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—J, MB
Felsenthal, G., & Sons, 4108 W. Grand, Chicago 51, Ill.—WP
Felt Products Mfg. Co., 1504 W. Carroll Ave., Chicago 7, Ill.—GA, WF, FW, WR
Fordham Mfg. Co., 2736 Creston Ave., New York 58, N. Y.—CM
Franklin Mfg. Corp., A. W., 175 Varick St., New York 14, N. Y.—BP, SC, GC, G, MB, SL, ST, TE, T, TS, TC, SKT, WB, FW, WP
Fuchs, Charles A., 13-15 Mollineaux Pl., Roosevelt, L. I., N. Y.—BP, C, CP, NL, N
Gardiner Mfg. Co., 2711 Union St., Oakland 7, Calif.—CC, H, NL, N, WB, WF, FW, WL, WP, WR
Garrett, George K., Co., Inc., D & Tioga Sts., Philadelphia 34, Pa.—CC, RR, SP, WL
Gear Specialties Co., 2635 W. Medill Ave., Chicago 47, Ill.—GE
G-C—General Cement Mfg. Co.
Gemloid Corp., 7910-30 Albion Ave., Elmhurst, L. I., N. Y.—WP
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—"G-C"—BP, CC, FH, GC, G, J, NL, MB, N, P, R, S, SS, SM, SL, L, SP, TE, SKT, WB, WF, FW, WL, WP, WR
General Electric Co., 1285 Boston Ave., Bridgeport 2, Conn.—"G-E"—CC, C, F, FH, NL, L
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—C, TC, SKT
General Electronics, Inc., 101 Hazel St., Paterson, N. J.—J, SKT
General Electronics Mfg. Co., 2225 S. Hoover St., Los Angeles 7, Calif.—P
General Laminated Products, Inc., 2857 S. Halsted St., Chicago 8, Ill.—SL, TE, T
General Plate Div., Metals & Controls Corp., Attleboro, Mass.—CM
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—BP, C, CF, CM, J, P
General Screw & Mfg. Co., 1228 W. Monroe St., Chicago 7, Ill.—S
General Tire & Rubber Co., Garfield, Wabash, Ind.—SR, SM, WB
Geophysical Instrument Co., 1820 N. Nash St., Arlington, Va.—C, CF
Gibsiloy—Gibson Electric Co.
Gibson Electric Co., 8350 Frankstown Ave., Pittsburgh 21, Pa.,—"Gibsiloy"—CM
Goat-Form-Fitting—Goat Metal Stampings, Inc.
Goat Metal Stampings, Inc., 814 Dean St., Brooklyn 17, N. Y.—"Goat-Form-Fitting"—TS
Gordon Specialties Co., 823 S. Wabash Ave., Chicago 5, Ill.—G
Grammes, L. F. & Sons, Inc., 392 Union St., Allentown, Pa.—CC, SC, G, H, RR, STE, SL, TE, WB
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.—WR
Gray Mfg. Co., 16 Arbor St., Hartford, Conn.—GE
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—CF, J
Great Metal Mfg. Corp., 5-13 Wyckoff Ave., Brooklyn 6, N. Y.—MB
Greenhut Insulation Co., 31 W. 21st St., New York, N. Y.—T, FW, WP
Gregory Mfg. Co., 67 Franklin St., New Haven 11, Conn.—C, FH, SL, L
Guided Radio Corp., 161 Sixth Ave., New York 13, N. Y.—T
Gussack Machined Products Co., 10-20 45th Rd., Long Island City 1, N. Y.—BP, CC, C, CF, CP, NL, MB, N, P
Harper Co., H. M., 2620 Fletcher St., Chicago 18, Ill.—N, R, S, WB
Harris Products Co., 5105 Cowan Ave., Cleveland, Ohio—CP "Torflex," SM "Duflex"
Hartford Machine Screw Co., 476 Capitol Ave., Hartford 2, Conn.—BP, CP, NL, N, S, ST, WB, WL
Harwood Co., Div. Los Angeles Corp., 540 N. LaBrea St., Los Angeles, Calif.—C
Haskell Mfg. Co., William H., 24 Commerce St., Pawtucket, R. I.—N, S
Hassall, John, Inc., Clay & Oakland Sts., Brooklyn 22, N. Y.—R, S, WB
Heyman Mfg. Co., Michigan Ave., Kenilworth, N. J.—SL, ST, TE, WB, FW
Hermaseal Co., Riverside Dr., Elkhart, Ind.—TH
High Tension Co., Inc., 36 N. Main St., Phillipsburg, N. J.—CC, C, SL, TE
Hunter Pressed Steel Co., Lansdale, Pa.—SP
Hubbell, Harvey, Inc., State St., Bridgeport, Conn.—C, SKT
Hy-Pro Tool Co., New Bedford, Mass.—N, S, SS
ICA—Insuline Corp. of America
Industrial Screw & Supply Co., 717 W. Lake St., Chicago 6, Ill.—BP, SC, FH, GA, G, NL, N, R, S, SS, SR, SL, L, LI, PS, SP, TE, WB, WF, FW, WL, WP, WR
Industrial Synthetic Corp., 60 Woolsey St., Irvington 11, N. J.—"Synflex"—G, WP, WR
Instrument Specialties Co., Inc., Little Falls, N. J.—SP
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—"ICA"—BP, CC, C, SC, CS, CP, FH, GC, G, J, NL, MB, N, P, R, STE, S, SS, SL, L, PS, TE, T, TS, SKT, WB, WF, FW, WL, WR
Insurok—Richardson Co.
International Merit Products Corp., 254 W. 54th St., New York 19, N. Y.—NL, R, S
International Screw Co., 9444 Roselawn Ave., Detroit, Mich.—S
Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.—WP
J.F.D. Mfg. Co., 4111 Ft. Hamilton Parkway, Brooklyn 19, N. Y.—C, P, TS, TC
Johns-Manville Sales Corp., 22 E. 40th St., New York 16, N. Y.—QA
Johnson Co., E. F., Waseca, Minn.—"Johnson"—CS, CP, FH, GC, J, P, STE, SL, TE, T, TS, TC, SKT, C, PL
Jones Co., Howard B., 2460 W. George St., Chicago 18, Ill.—C, FH, J, P
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—BP, CC, C, SC, CM, J, NL, MB, N, P, SL, L, TE, T, WB, WF, FW, WL, WP
Keystone Carbon Co., Inc., 1935 State St., St. Marys, Pa.—CM
Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—J, TE, T, WP
Kings Electronics Co., 372 Classon Ave., Brooklyn 5, N. Y.—CF
Kirkman Engineering Corp., 121 6th Ave., New York 13, N. Y.—F, FH
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 321 W. 50th St., New York 19, N. Y.—C, L
Kollath Mfg. Co., 4601 W. Addison St., Chicago, Ill.—BP, CC, C, SC, FH, MB, P, SL, WB, FW
Kolton Electric Mfg. Co., 123 New Jersey Railroad Ave., Newark 5, N. J.—C, FH, SL, L, TE, T
Krementz & Co., 49 Chestnut St., Newark 5, N. J.—TB
Kriscner Metal Products Co., 631-637 Kent Ave., Brooklyn 11, N. Y.—BP, CC, C, SC, GC, H, WB
Kulka Electric Mfg. Co., Inc., 30 South St., Mount Vernon, N. Y.—CC, GC, SL, T, TC
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, Ohio—S
Lapp Insulator Co., Inc., 24 Craigie St., Le Roy, N. Y.—CF
Lear, Inc., Piqua, Ohio—GE
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.—SP
Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn.—C, SL, TE
Littelfuse, Inc., 4757 Ravenswood Ave., Chicago 40, Ill.—F, FH, TE
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.—CP, SM, WB
Manross, F. N. & Sons, Div. Associated Spring Corp., 76 South St., Bristol, Conn.—S
Manufacturers Screw Products, 216 W. Hubbard St., Chicago, Ill.—G, N, R, S, SS, TE, WB, WL
Martindale Electric Co., Box 617, Edgewater Branch, Cleveland 7, Ohio—FW
Mayfair Molded Products Corp., 4440 N. Elston Ave., Chicago 30, Ill.—TE, T, SKT, WP
McInerney Plastics Co., 25 Commerce Ave., S.W., Grand Rapids 2, Mich.—CS, GA, J, MB, RR, STE, T, FW, WP
Meirath Supply & Gasket Co., Tioga St. & Aramingo Ave., Philadelphia, Pa.—GA
Mendelsohn Speedgun Co., 457 Bloomfield Ave., Bloomfield, N. J.—C, CF, GA, J, N, P
Metallic Arts Co., 243 Broadway, Cambridge 39, Mass.—TS
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—FW
Micarta Fabricators, Inc., 5324 Ravenswood Ave., Chicago 40, Ill.—T, WP
Milford Rivet & Machine Co., Eastern Div., Milford, Conn.—BP, C, G, J, R, S, SS
Millen, James, Mfg. Co., Inc., 150 Exchange St., Malden 48, Mass.—BP, CS, CP, GC, NL, STE, TE, T, TS, TC, SKT
Miller Co., J. W., 5917 S. Main St., Los Angeles 3, Calif.—"Miller"—T
Mines Equipment Co., 4215 Clayton Ave., St. Louis 10, Mo.—C
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—BP, CC, C, CF, CP, J, NL, PL, MB, P, RR, TE, T, WR
Monitor Controller Co., 51 S. Gay St., Baltimore 2, Md.—GC
Monowatt Electric Corp., 66 Bissell St., Providence, R. I.—C
Morse Co., Frank W., 301 Congress St., Boston 10, Mass.—CC, C, SC, PL
Mossman, Donald P., Inc., 612 N. Michigan Ave., Chicago 11, Ill.—J
Mueller Electric Co., 1583 E. 31st St., Cleveland 14, Ohio—"Universal"—SC
Multi Electrical Mfg. Co., 4223 W. Lake St., Chicago, Ill.—SC, FH, SL
National Co., Inc., 61 Sherman St., Malden 48, Mass.—BP, SC, CS, CM, CP, GC, J, NL, MB, P, STE, TS, SKT
National Fabricated Products, 2650 W. Belden Ave., Chicago 47, Ill.—C, CF, J, TE, T, SKT
National Gasket & Washer Mfg. Co., 122 E. 25th St., New York 10, N. Y.—GA, SR, WF, FW, WP, WR
National Lock Co., 1902 Seventh St., Rockford, Ill.—H, N, S, SS
National Lock Washer Co., 40 Hermon St., Newark, N. J.—WL, RR
National Molding Co., 2141 W. Washington Blvd., Los Angeles 7, Calif.—GA, SM, WP, WR
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, Ohio—NL, N, R, S, SS
National Vulcanized Fibre Co., Maryland Ave. & Beech St., Wilmington 99, Del.—T, FW, WP
New Britain Spring Co., 696 W. Main St., New Britain, Conn.—SP
New England Screw Co., Emerald St., Keene, New Hampshire—S
Ney, J. M., Co., 71 Elm St., Hartford 1, Conn.—CM
Northam Warren Corp., Barry Pl., Stamford, Conn.—CC, C, P
North Electric Mfg. Co., Box 417, Galion, Ohio—J, T
Oak Mfg. Co., 1260 Clybourn Ave., Chicago 10, Ill.—GE, CP
Ocram Corp., Auburn Rd., Seneca Falls, N. Y.—SM
Olympic Tool & Mfg. Co., Inc., 39 Chambers St., New York 7, N. Y.—T, TS
Palnut Co., 83 Cordier St., Irvington 11, N. J.—FA, N, WL
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.—N, S, SS, ST
Pass & Seymour, Inc. Syracuse 9, N. Y.—P
Patton-MacGuyer Co., 17 Virginia Ave., Providence 5, R. I.—SL, L, TE
Paul & Beekman, Div. Portable Products Corp., 1801 Courtland St., Philadelphia 40, Pa.—CS, MB, TS, TC
Pawtucket Screw Co., Pawtucket, R. I.—S
Peck Spring Co., 20 Grove St., Plainville, Conn.—SC, G, SP

Peerless Laboratories, 467 Tenth Ave., New York 18, N. Y.—J, P
Penn Engineering & Mfg. Corp., Box 311, Doylestown, Pa.—NL
Penn Fibre & Specialty Co., 2024-2030 E. Westmoreland St., Philadelphia 34, Pa.—GA, G, T, WB, WF, FW, WL, WP, WR, GE
Penn-Union Electric Corp., 315 State St., Erie, Pa.—C, SC, CP, FH, GC, N, SL, T, WL
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.—NL, N, S, SS, WB
Phonograph Needle Mfg. Co., Inc., 42-46 Dudley St., Providence 5, R. I.—S
Piezo Mfg. Corp., 110 E. 42nd St., New York 17, N. Y.—CP
Pilot Industries, Inc., 202 E. 44th St., New York 17, N. Y.—BP, C, CF, CP, N, S, WB, FW
Plastic Accessories, Inc., 460 Broome St., New York 13, N. Y.—WP
Plax Corp., 133 Walnut St., Hartford 5, Conn.—WP
Plume & Atwood Mfg. Co., 470 Bank St., Waterbury 88, Conn.—FA, G, B
Porcelain Products, Inc., Findlay, Ohio—CC
Precision Radio Co., 210-220 N. Western Ave., Los Angeles 4, Calif.—P, T
Presto Electric Co., 4511 New York Ave., Union City, N. J.—J
Prestole Division, Detroit Harvester Co., 4500 Detroit Ave., Toledo 12, Ohio—CC, SC, FH, NL, MB, RR, SP
Printloid, Inc., 93 Mercer St., New York 12, N. Y.—WP
Progressive Mfg. Co., 52 Norwood St., Torrington, Conn.—N, R, S
Publix Metal Prod., Inc., 100 Sixth Ave., New York 13, N. Y.—SC, CS, TE
Pyle-National Co., 1334 N. Kostner Ave., Chicago 51, Ill.—C, P
Quadriga Mfg. Co., 213 W. Grand Ave., Chicago 10, Ill.—MB, TE, WB, FW
Quaker City Gear Works, 1910 N. Front St., Philadelphia, Pa.—GE
Radex Corp., 2066 Elston Ave., Chicago 14, Ill.—BP
Radio Frequency Laboratories, Inc., Boonton, N. J.—MB, N
Rajah Co., 53 Locust Ave., Bloomfield, N. J.—C
Rattan Mfg. Co., P. O. Box 1745, New Haven, Conn.—LI
Raymond Mfg. Co., Div. Associated Spring Corp., Corry, Pa.—SP
Reading Screw Co., Norristown, Pa.—S
Reeder, J. L., 3047 N. Downer Ave., Milwaukee 11, Wis.—ST
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, Ohio—SC, SP
Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—"Remler"—BP, C, P, TE, SKT
Richardson Co., Melrose Park, Ill.—"Insurok"—WP
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—SM
Rupp's Assembling & Mfg. Works, 2341 N. Seminary Ave., Chicago 14, Ill.—P, TE
Rusgreen Mfg. Co., 14262 Birwood Ave., Detroit 4, Mich.—C, SL, TE, T
Russell-Burdsall & Ward Bolt & Nut Co., 100 Midland Ave., Port Chester, N. Y.—N, S
Russell & Stoll Co., 125 Barclay St., New York 7, N. Y.—J, P
St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.—WP
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—TS
Saxonburg Potteries, Saxonburg, Pa.—CF
Schott, Walter L., Co., 9306 Santa Monica Blvd., Beverly Hills, Calif.—BP, CC, C, G, J, LN, NB, NL P, RR, S, SS, SR, SM, SL, L, SP, ST, WB, WF, FW, WL, WP, WR
Scovill Mfg. Co., 99 Mill St., Waterbury 91 Conn.—G, P, RR, S, SS, TE, TS, WB
Sealol Corp., 45 Willard Ave., Providence 5, R. I.—CP
Selectar Mfg. Corp., 21-10 49th Ave., Long Island City 1, N. Y.—C, CF
Sexton Can Co., Inc., 31 Cross St., Everett 49, Mass.—CS, MB, TS
Shakeproof, Inc., 2501 N. Keeler Ave., Chicago 39, Ill.—SS, TE, WL, GE
Sherman Mfg. Co., H. B., 18 Barney St., Battle Creek, Mich.—C, SC, SL, L, TE
Shur-Antenna-Mount, Inc., 272 Sea Cliff Ave., Sea Cliff, N. Y.—MB
Shure Bros., 225 W. Huron St., Chicago 10, Ill.—C
Sickles, F. W. Co., 165 Front St., Chicopee, Mass.—CP
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—SKT
Simmons Fastener Corp., N. Broadway, Albany 1, N. Y.—FA, N
Skydyne, Inc., River Rd., Port Jervis, N. Y.—SM
Sonotone Corp., Saw Mill River Rd., Elmsford, N. Y.—J
S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N. Y.—SC
Southington Hardware Mfg. Co., Southington, Conn.—S
Spaulding Fibre Co., Inc., 310 Wheeler St., Tonawanda, N. Y.—GA, G, FW, WP
Sperman Metal Specialties, 2199 E. 21st St., Brooklyn 29, N. Y.—WB, FW, WP
Sperti, Inc., Beech & Kenilworth, Norwood Sta., Cincinnati 12, Ohio—TH
Stamford Metal Specialty Co., 428 Broadway, New York 13, N. Y.—CC
Standard Electric Time Co., 89 Logan St., Springfield 2, Mass.—SC, J, P, L
Standard Locknut & Lockwasher, Inc., 33-35 St. Clair St., Indianapolis 4, Ind.—NL, WL
Standard Molding Corp., 460 Bacon St., Dayton 1, Ohio—G, WP
Standard Pressed Steel Co., Jenkintown, Pa.—N, NL, S
Stanley Works, New Britain, Conn.—H
States Co., 19 New Park Ave., Hartford 6, Conn.—BP, CC, C, SC, P, PS, T, TE
Stephens Mfg. Co., 10416 National Blvd., Los Angeles 34, Calif.—SL
Sterling Bolt Co., 209 W. Jackson Blvd., Chicago 6, Ill.—N, R, S, SS, WB, WL
Stewart Stamping Co., 630 Central Park Ave., Yonkers 4, N. Y.—CC, C, SC, MB, SL, L, TE, WB
Stimpson, Edwin B., Co., Inc., 70 Franklin Ave., Brooklyn 5, N. Y.—R, TE, WB
Stover Lock Nut & Machinery Corp., 101 Park Ave., New York 17, N. Y.—NL
Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.—TH
Sundt Engineering Co., 4763 Ravenswood Ave., Chicago, Ill.—TE
Superior Carbon Products, Inc., 9117 George Ave., Cleveland 5, Ohio—CM
Synflex—Industrial Synthetics Corp.
Taller & Cooper, 75 Front St., Brooklyn 1, N. Y.—CF
Taylor Fibre Co., Norristown, Pa.,—T, FW, WP
Telegraph Apparatus Co., 412 S. Green St., Chicago, Ill.—C, J, P
Teleoptic Co., 1251 Mound Ave., Racine, Wis.—BP, FH, MB, WB, GE
Thomas & Betts Co., 30-36 Butler St., Elizabeth 1, N. J.—CC, C, CF, CP, NL, L, ST, TE, T, WL
Thompson Bremer & Co., 1640 W. Hubbard St., Chicago, Ill.—"Everlock"—WL
Thompson, George S. Corp., 5240 Huntington Drive, Los Angeles 32, Calif.—TC
Thwing Albert Instrument Co., Penn St. & Pulaski Ave., Philadelphia 44, Pa.—BP
Tinnerman Products, Inc., 2111 Fulton Rd., Cleveland 13, Ohio—CC, SC, NL, MB, N
Torflex—Harris Products Co.
Trico Fuse Mfg. Co., 2948 N. Fifth, Milwaukee 12, Wis.—F, FH
Triumph Mfg. Co., 913 W. Van Buren St., Chicago 7, Ill.—J
Tubular Rivet & Stud Co., Wollaston 70, Mass.—R, TE
Tyer Rubber Co., Andover, Mass.—GA, SR, SM
Ucinite Co., Div. United-Carr Fastener Corp., Newtonville, Mass.—GC, J, MB, SM, SL, L, TE, T, TS, TC, SKT
Union Aircraft Products Corp., 245 E. 23rd St., New York 10, N. Y.—CP
United Radio Mfg. Co., 191 Greenwich St., New York, N. Y.—WP
United Screw & Bolt Corp., 2513 W. Cullerton St., Chicago 8, Ill.—N, S, SS, WB
Universal—Mueller Electric Co.
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—C, CF, WR
Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—J, P
Vitroseal Corp., 342 Crescent Ave., Wyoming, Cincinnati 15, Ohio—TH, T
Volynsky, Boris M., Mfg. Co., Inc., 311 W. 66th St., New York 23, N. Y.—C
Waldes Koh-I-Noor, Inc., 47-10 Austel Pl., Long Island City 1, N. Y.—RR
Waltham Screw Co., 77 Rumford Ave., Waltham, Mass.—BP, CC, CF, CM, NL, N, P, RR, R, S
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—G, P, STE, SL, L, TE, T, SKT, WB, WP
Westinghouse Elec. Corp., East Pittsburgh, Pa.—CF, CM, SM, SL, T, SKT
Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—CF
Whitaker Cable Corp., N. Kansas City Sta., Kansas City 16, Mo.—TE
Whitehead Stamping Co., 1661 W. Lafayette Blvd., Detroit 16, Mich.—WB, FW
Wickwire Spencer, Metallurgical Corp., 260 Sherman Ave., Newark 5, N. J.—SC, GC, RR, SP
Wilson Plastics Division, Wilson Magazine Camera Co., 6022 Media St., Philadelphia 31, Pa.—T, WP
Wilmington Fibre Specialty Co., P. O. Drawer 1028, Wilmington 99, Del.—FW
Winters & Crampton Corp., Grandville, Mich.—H
Wisconsin Screw Co., 21st & Clark Sts., Racine, Wis.—BP, CM, CP, NL, N, P, RR, STE, S
Wolverine Bolt Co., 9685 Grinnell, Detroit, Mich.—S
Wood, C. D., Electric Co., Inc., 826 Broadway, New York 3, N. Y.—C
Wrought Washer Mfg. Co., 2100 S. Bay St., Milwaukee 7, Wis.—WB, FW, WL
Wynn Mfg. Division, Hudson Supply Co., 401 N. 27th St., Richmond 23, Va.—J, P
Zierick Mfg. Corp., 385 Gerard Ave., New York 51, N. Y.—CC, SC, GC, SL, L, TE, WB

USE THE INDEX

To find the manufacturer of any product, look first in the Index. For example, "Counters, electronic 12-C", means that under Section 12, "Electronic Control Equipment", the letter "C" after a manufacturer's name indictates his ability to supply electronic counting devices.

(17) Insulation & Insulators

(See also PAINTS, CEMENT & INSULATING COMPOUNDS)

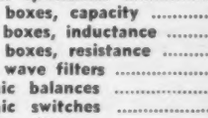
Alundum grain ..... AG
Bonded mica ..... BM
Can liners CL
Ceramic parts C
Capacitor paper ..... CP
Coil insulation tape ..... ST
Glass tubing ..... G
Glass bonded mica ..... GM
Fibre ..... F
Insulating beads ..... IB
Insulating coatings IC
Fibre-glass ..... FG
Friction tape ..... FT
Metallized bushings ..... MB
Mica ..... M
Paper ..... P
Paper tubing ..... PT
Plastics ..... PL
Rubber insulation ..... RI
Silicone materials ..... SM
Stand-off insulators ..... SO
Tubing (varnished) ..... T
Varnished fabrics ..... VF

Acme Folding Box Co., Inc., 141 E. 25th St., New York 10, N. Y.—CL
Acme Wire Co., New Haven 14, Conn.—FG, P, VF
Akron Porcelain Co., Cory Ave., Akron 14, Ohio—C, SO
Aldine Paper Co., Inc., 535 Fifth Ave., New York 17, N. Y.—P
Alpha Wire Corp., 50 Howard St., New York 13, N. Y.—T
Alsimag—American Lava Corp.
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.—RI
American Lava Corp., Chattanooga 5, Tenn.—"Alsimag"—C, IB, SO, MB
American Phenolic Corp., 1830 S. 54th St., Cicero, Ill.—"Amphenol"—C, IB, PL
American Products Mfg. Co., Oleander & Dublin Sts., New Orleans 18, La.—PL
American Radio Hardware Co., 152-4 MacQuesten Parkway S., Mt. Vernon, N. Y.—C, SO
Amphenol—American Phenolic Corp.
Arens Controls, Inc., 2253 S. Halsted St., Chicago 8, Ill.—RI, T
Armite—Spaulding Fibre Co., Inc.
Armstrong Cork Co., Lancaster, Pa.—RI
Asheville Mica Co., Biltmore, N. C.—BM, GM, M
Atlas Products Corp., 30 Rockefeller Plaza, New York 20, N. Y.—FG, T, VF
Auburn Button Works, Inc., Auburn, N. Y.—PL
Ault & Wiborg Div. of Interchemical Corp., 350 Fifth Ave., New York 1, N. Y.—CL
Baer Co., N. S., 9-11 Montgomery St., Hillside, N. J.—F, PL
Bakelite Corp., 30 E. 42nd St., New York 17, N. Y.—"Bakelite", "Fenox", "Vinylite", "Vinylseal", "Zerox"—ST, IC, PL
B & C Insulation Products, Inc., 261 Fifth Ave., New York, N. Y.—PL, T, VF
Bend-A-Lite Plastics Div., 423 S. Honore St., Chicago 12, Ill.—PL
Bentley-Harris Mfg. Co., Conshohocken, Pa.,—"B-H"—G, T, VF
Berger Electronics, 109-01 72nd Rd. Forest Hills, N. Y.—BM, IB, PL
B-H—Bentley-Harris Mfg. Co.
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N. Y.—C, F, SO, T
Brand & Co., Wm., 276 Fourth Ave., New York 10, N. Y.—"Turbo"—BM, G, F, FG, M, P, T, VF
Brandywine Fibre Products Co., 14th & Walnut Sts. Wilmington, Del.—F
Brown Co., 500 Fifth Ave., New York 18, N. Y.—F
Burndy Engineering Co., Inc., 107 Bruckner Blvd., New York 54, N. Y.—PL
Carter Products Corp., 6921 Carnegie Ave., Cleveland 3, Ohio—PL
Celanese Plastics Corp., 180 Madison Ave., New York 16, N. Y.—ST, FT, PL
Central Paper Co., Inc., 2400 Lakeshore Drive, Muskegon, Mich.—P
Centralab Div. of Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—C, IB, SO
Clifton Products, Inc., Blackbrook Road, Painesville, Ohio—C
Colonial Kolonite Co., 2214 Armitage Ave., Chicago 47, Ill.—BM, F, FG, PL, T
Condenser Products Co., 1375 N. Branch St., Chicago 22, Ill.—SM
Continental-Diamond Fibre Co., Newark 50, Del.—"Dilecto"—BM, ST, F, FG, M, PL
Cook Ceramic Mfg. Co., 500 Prospect St., Trenton, N. J.—C, SO
Cords Ltd., Inc., 28 Camp St., Newark 5, N. J.—RI
Corning Glass Works, Corning, N. Y.—G, SO
Crolite—Henry L. Crowley & Co.

Crowley & Co., Inc., Henry L., 1 Central Ave., West Orange, N. J.—"Crolite"—C, IB, SO, MB
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.—PL
Davies Molding Co., Harry, 1428 N. Wells St., Chicago 10, Ill.—PL
Diemolding Corp., Rasbach St., Canastota, N. Y.—PL
Dilecto—Continental-Diamond Fibre Co.
Dobeckmun Co., 2301 Monroe Ave., Cleveland 13, Ohio—ST, F, P
Dow Corning Corp., Midland, Mich.—ST, FG, RI, T
Drakenfeld & Co., Inc., B. F., 45 Park Place, New York 7, N. Y.—C
Durez Plastics & Chemicals, Inc., 1926 Walck Rd., North Tonawanda, N. Y.—"Durez"—PL
Durite Plastics, 5000 Summerdale Ave., Philadelphia 24, Pa.—PL
Eclipse Moulded Products Co., 5150 N. 32nd St., Milwaukee 9, Wis.—PL
Edwards, Inc., T. J., 210 South St., Boston 5, Mass.—FG, PL
Electrical Insulation Co., 12 Vestry St., New York 13, N. Y.—PL, T
Electrical Reactance Corp., Franklinville, N. Y.—SO
Electronic Mfg. Co., 339-347 W. Eighth Ave., Dubuque, Iowa—F
Electronic Mechanics, Inc., 70 Clifton Blvd., Clifton, N. J.—GM
Electro-Technical Products, Inc., 115 Center St., Nutley 10, N. J.—ST, FG, P, VF
Empire—Mica Insulator Co.
Endurette Corp. of America, 45 W. 45th St., New York 19, N. Y.—VF
Erie Resistor Corp., 640 W. 12th St., Erie, Pa.—PL
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—C
Felsenthal & Sons, G., 4108 W. Grand, Chicago 51, Ill.—PL
Felt Products Mfg. Co., 1504 W. Carroll Ave., Chicago 7, Ill.—F, VF
Fenox—Bakelite Corp.
Ford Radio & Mica Corp., 536 63rd St., Brooklyn 20, N. Y.—M
Franklin Fibre-Lamitex Corp., Wilmington, Del.—F, PL
Fredericks Co., George E., Bethayres, Pa.—G
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—"G-C"—ST, G, F, FG, FT, P, PL, RI, T, VF
General Ceramics & Steatite Corp., Crows Mill Rd., Keasbey, N. J.—C, IB, SO
General Electronics, Inc., 101 Hazel St., Paterson, N. J.—GM, SO
General Laminated Products, Inc., 2857 S. Halsted St., Chicago 8, Ill.—PL
Goodrich Chemical Co., B. F., Rose Bldg., Cleveland 15, Ohio—PL
Greenhut Insulation Co., 31 W. 21st St., New York, N. Y.—F, PL
Hartford Machine Screw Co., 476 Capital Ave., Hartford 2, Conn.—PL
Hodgman Rubber Co., Framingham, Mass.—RI
ICA—Insuline Corp. of America
Imperial Molded Products Corp., 2925 W. Harrison St., Chicago 12, Ill.—PL
Imperial Porcelain Works, N. Y. Ave. & Mulberry St., Trenton, N. J.—C
Industrial Fabricators, Inc., 1890 Carter Rd., Cleveland 13, Ohio—F
Industrial Molded Products Co., 2035 Charleston St., Chicago, Ill.—PL
Industrial Screw & Supply Co., 717 W. Lake St., Chicago 6, Ill.—FT, PT, RI, T, VF, MB
Industrial Synthetics Corp. 60 Woolsey St., Irvington 11, N. J.—"Synflex"—PL, RI
Industrial Tape Corp., Highway No. 1, New Brunswick, N. J.—FT
Insl-X Co., Inc., 857 Meeker Ave., Brooklyn 22, N. Y.—PL
Insulating Fabricators of New England, Inc., 69 Grove St., Watertown, Mass.—F, PL
Insulating Tube Co., Inc., 26 Cottage St., Poughkeepsie, N. Y.—PT, PL
Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 6, Ill.—BM, F, FG, FT, G, M, P, PT, RI, ST, T, VF
Insulation Products Co., 504 N. Richland St., Pittsburgh 8, Pa.—PL
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—"ICA"—F, IB, FG, T, VF
Insurok—Richardson Co.
International Products Corp., 2254 Greenmount Ave., Baltimore 18, Md.—BM, GM, PL
Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.—"Irv-O-Volt"—CL, CP, ST, G, F, FG, P, PL, T, VF
Irv-O-Volt—Irvington Varnish & Insulator Co.
Isolantite, Inc., 343 Cortlandt St., Belleville 9, N. J.—C, IB, SO, MB
Johns-Manville Sales Corp., 22 E. 40th St., New York 16, N. Y.—F, P
Johnson Co., E. F., Waseca, Minn.—C, GM, SO
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—FT
Kilburn Glass Co., Inc., J. R., 22 S. Worcester St., Chartley, Mass.—C, IB
Kirchberger & Co., Inc., M., 1425 37th St., Brooklyn 18, N. Y.—C
Knox Porcelain Corp., Knoxville, Tenn.—C, SO
Kuhn & Jacob Molding & Tool Co., 1200 Southard St., Trenton, N. J.—PL
Lamicord—Mica Insulator Co.
Lapp Insulator Co., Inc., 24 Craigie St., LeRoy, N. Y.—C, SO
Lavite—D. M. Steward Mfg. Co.
Lenoxite Div., Lenox, Inc., 65 Prince St., Trenton 5, N. J.—C, IB, SO, MB
Locke Insulator Corp., P. O. Box 57, Baltimore 3, Md.—C, SO
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.—RI
Macallen Co., Macallen St., Boston 24, Mass.—ST, GM FG, M, T
Maico Co., Inc., 21 N. Third St., Minneapolis 1, Minn.—PL
Manning, John A., Paper Co., Troy, N. Y.—F, P
Marblette Corp., 37-21 Thirtieth St., Long Island City
Mayfair Molded Products Corp., 4440 N. Elston Ave., Chicago 30, Ill.—PL
Metsch Refractories, E. Liverpool, Ohio—C
Mica Insulator Co., 200 Varick St., New York 14, N. Y.—"Micanite," "Empire," "Munsell," "Lamicord"—BM, CP, ST, GM, F, FG, FT, M, PL, T, VF
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—BM, C, GM, F, FG, FT, M, P, PT, PL, T, VF
Micanite—Mica Insulator Co.
Micarta Fabricators, Inc., 5324 Ravenswood Ave., Chicago 40, Ill.—PL
Milham—Union Electrical Porcelain Works, Inc.
Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass.—C, SO
Milprint, Inc., 431 W. Florida St., Milwaukee 1, Wis.—PL
Minn. Mining & Mfg. Co., 900 Facquier Ave., St. Paul 6, Minn.—ST
Mitchell Rand Insulation Co., 51 Murray St., New York 7, N. Y.—RM, ST, GM, F, FG, FT, M, P, PT, T, VF
Mueller Electric Co., 1583 E. 31st St., Cleveland 14, Ohio—RI
Munsell—Mica Insulator Co.
Munsell & Co., Eugene, 200 Varick St., New York 14, N. Y.—BM, M
Mycalex Corp. of America, 60 Clifton Blvd., Clifton, N. J.—C, GM, SO
Mykroy, Inc., 1917 N. Springfield Ave., Chicago 47, Ill.—SO, BM
National Ceramic Co., 400 Southard St., Trenton 2, N. J.—C, IB, SO
National Company, Inc., 61 Sherman St., Malden 48, Mass.—"N-C"—C, SO
National Fabricated Products, 2650 W. Belden Ave., Chicago 47, Ill.—C
National Molding Co., 2141 W. Washington Blvd., Los Angeles 7, Calif.—PL
National Porcelain Co., 400 Southard St., Trenton, N. J.—BC, IB, SO
National Tile & Mfg. Co., 1200 E. 26th St., Anderson, Ind.—C, IB, SO
National Varnished Products Corp., 211 Randolph Ave., Woodbridge, N. J.—T, VF
National Vulcanized Fibre Co., Maryland Ave., & Beech St., Wilmington 99, Del.—"Phenolite"—F, PL
N-C—National Company, Inc.
New England Mica Co., Waltham, Mass.—M
Norton Co., 1 New Bond St. ,Worcester 6, Mass.—AG
Norton Laboratories, Inc., 560 Mill St., Lockport, N. Y.—PL
Ogush, Wm. B., Inc., 33 W. 60th St., New York 23, N. Y.—BM, IB
Okonite Co., Passaic, N. J.—FT, RI
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, Ohio—ST, G, GM, F, IB, FG, FT, PL, SO, T, VF
Pacific Clay Products, SteaPACtite Div., 306 W. Ave. 26, Los Angeles 31, Calif.—"SteaPACtite"—C
Paper Manufacturers Co., 5th & Willow Sts., Philadelphia 23, Pa.—P
Parisian Novelty Co., 3510 S. Western Ave., Chicago 9, Ill.—PL
Pass & Seymour, Inc., Syracuse 9, N. Y.—C
Pemco Corp., 5601 Eastern Ave., Baltimore 24, Md.—C
Penn Fibre & Specialty Co., 2024 to 2030 E. Westmoreland St., Philadelphia 34, Pa.—F, P, PL
Phenolite—National Vulcanized Fibre Co.
Philadelphia Mica Corp., 3451 N. 10th St., Philadelphia 40, Pa.—M
Pierce Laboratory, Inc., Summit, N. J.—"Pierceway" PL
Plastic Accessories, Inc., 460 Broome St., New York 13, N. Y.—PL
Plating Processes Corp., 109 Lyman St., Holyoke, Mass.—MB
Plax Corporation, 133 Walnut St., Hartford 5, Conn.—PL
Porcelain Products, Inc., Findlay, Ohio—C, SO
Precision Paper Tube Co., 2035 W. Charleston St., Chicago 47, Ill.—CL, PT
Premax Products, Div., Chisholm-Ryder Co., Inc. 4612 Highland Ave., Niagara Falls, N. Y.—SO
Printloid, Inc., 93 Mercer St., New York 12, N. Y.—PL
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—C, IB, M
Richardson Co., Melrose Park, Melrose Park, Ill.—"Insurok"—PL, RI
Rogan Bros., 2001 S. Michigan Ave., Chicago, Ill.—PL
Rogers Corp., Mill & Oakland Sts., Manchester, Conn.—CL, F, P, PL
Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.—PL
Ruberoid Co., 500 Fifth Ave., New York 18, N. Y.—ST, P
St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.—PL
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—PL, T
Santay Corp., 351 N. Crawford Ave., Chicago 24, Ill.—PL
Saxonburg Potteries, Saxonburg, Pa.—C, IB, SO
Schweitzer Paper Co., 405 Lexington Ave., New York 17, N. Y.—CP, P
Southern Mica Co., Fairview & Steel Sts., Johnson City, Tenn.—M
Spaulding Fibre Co., Inc., 310 Wheeler St., Tonawanda N. Y.—"Armite"—F, PL, T, VF
Special Chemicals Co., 1545 E. 16th St., Cleveland 14, Ohio—PL
Sperti, Inc., Beech & Kenilworth, Norwood Sta., Cincinnati 12, Ohio—G, IB
Sponge Rubber Products Co., Shelton, Conn.—RI
Square D Co., 6060 Rivard St., Detroit, Mich.—P
Standard Insulation Co., 75 Paterson Ave., East Rutherford, N. J.—P, VF
Standard Molding Corp., 460 Bacon St., Dayton 1, Ohio—PL
Star Porcelain Co., Muirhead Ave., Trenton 9, N. J.—C, SO
Steward Mfg. Co., D. M., E. 36th St., Chattanooga, Tenn.—"Lavite"—C
StePACtite—Pacific Clay Co.
Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.—C, IB, SO
Synflex—Industrial Synthetics Corp.
Synthane Corp., Oaks, Pa.—"Synthane"—PL
Tar Heel Mica Co., Plumtree, N .C.—BM, M
Taylor Fibre Co., Norristown, Pa.—F, P, PT, PL, T
Thomas & Sons Co., R., Lisbon, Ohio—C
Tingstol Co., 1461 W. Grand Ave., Chicago 22, Ill.—FG, PL
Traver Corp., 358-368 W. Ontario St., Chicago 10, Ill.—PL
Turbo—Wm. Brand & Co.
Tyer Rubber Co., Andover, Mass.—RI
Union Elec. Porcelain Works, Inc., Vam St., Trenton 5, N. J.—"Milham"—C
United Mineral & Chemical Co., 16 Hudson St., New York 13, N. Y.—M
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—FT, RI
Varflex Corp., N. Jay St., Rome, N. Y.—FG, PL, T, VF
Vinylite—Bakelite Corp.
Vinyon—Bakelite Corp.
Vinylseal—Bakelite Corp.
Washington Porcelain Co., Washington, N. J.—SO
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—IB, PL, MB
Westinghouse Elec. Corp., East Pittsburgh, Pa.—BM, C, ST, GM, F, FG, FT, M, P, PL, SM, SO, VF, MB
Wilmington Fibre Specialty Co., P. O. Drawer 1028, Wilmington 99, Del.—F, P, PL
Wind Turbine Co., West Chester, Pa.—SO
Wright & Sons Co., Wm. E., Industrial Textile Div., West Warren, Mass.—ST
Zyrox—Bakelite Corp.

(18) Laboratory Equipment

(See also MEASURING INSTRUMENTS)



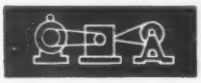
Calibrators ..... **CA**
Capacitor specialties ..... **C**
Decade boxes, capacity ..... **DC**
Decade boxes, inductance ..... **DI**
Decade boxes, resistance ..... **RD**
Electric wave filters ..... **E**
Electronic balances ..... **EB**
Electronic switches ..... **ES**
Equalizing filters ..... **EF**
Gas analyzers ..... **GA**
Geiger-Mueller counter ..... **GM**
Inductance specialties ..... **L**
Lenses ..... **LE**
Multivibrators ..... **MV**
Optical equipment ..... **OE**
Oscillographs, direct-writing ..... **OD**
Oscillographs, cathode ray ..... **O**
Power supplies, regulated ..... **PR**
Power supplies, unregulated ..... **PU**
Pulse generators ..... **PG**
Radio spectrum analyzers ..... **RA**
Resistance specialties ..... **R**
Salt-spray cabinets ..... **SC**
Signal generators, AF ..... **SA**
Signal generators, FM ..... **SF**
Signal generators, RF ..... **SR**
Spectographic equipment ..... **S**
Square wave generators ..... **SW**
Stroboscopes ..... **ST**
Surface analyzers ..... **SM**
Temperature test cabinets ..... **TT**
Tuning fork oscillators ..... **TO**
Ultrasonic oscillators ..... **SO**
Video pattern generators ..... **VP**
Video-range oscillators ..... **VO**

Advance Research Corp., 214 W. 42nd St., New York, N. Y.—E, EF, RA
Aerovox Corp., 740 Belleville Ave., New Bedford, Mass.—C, DC, R
AIC—Atomic Instruments Co.

Air Communications, Inc., 2233 Grand Ave., Kansas City, Mo.—SA
Airadio, Inc., Melrose Ave. & Barry Place, Stamford, Conn.—SA
Aircraft-Marine Products, Inc., 1523 N. 4th St., Harrisburg, Pa.—E
Airdesign, Inc., 241 Fairfield Ave., Upper Darby, Pa.—EF
Air-Track Mfg. Corp., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—PR, PU, SW
Airtronics Development Corp., 131-133 E. Third St., Dayton 2, Ohio—SR
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—MV, TO
All American Tool & Mfg. Co., 1014 W. Fullerton Ave., Chicago 14, Ill.—MV
American Instrument Co., 8030-8050 Georgia Ave., Silver Spring, Md.—DC, RD, TT, SC, TO
American Lens Co., Inc., 45 Lispenard St., New York 13, N. Y.—OE
American Optical Co., Scientific Instrument Div., 19 Doat St., Buffalo 11, N. Y.—LE, OE
American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—SW, SA
American Television Laboratories, Inc., 433 E. Erie St., Chicago 11, Ill.—O
American Time Products, Inc., 580 Fifth Ave., New York 19, N. Y.—MV, SA, TO
Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—E, EF, SO
Annis, R. B. Co., 1101 N. Delaware St., Indianapolis 2, Ind.—O
Applied Research Laboratories, 4336 San Fernando Rd., Glendale 4, Calif.—S
Associated Research, Inc., 231 S. Green St., Chicago 7, Ill.—"Vibrotest"—R, ST
Atomic Instrument Co., 160 Charles St., Boston, Mass.—ARC—GM
Audio Development Co., 2833 13th Ave. S., Minneapolis 7, Minn.—EF
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—EF, MV, SW, SA
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.—GA
Baker Instrument Co., 310 Main St., Orange, N. J.—OE, TT, S
Ballantine Laboratories, Inc., Boonton, N. J.—R
Barker & Williamson, Upper Darby, Pa.—EB, ES, EF, GA, L, MV, SW, SA, SR, SO
Bausch & Lomb Optical Co., Rochester 2, N. Y.—LE, OE, S
Belmont Radio Corp., 5921 W. Dickens Ave., Chicago 39, Ill.—O, SR
Bend-A-Lite Plastics Division, 423 S. Honore St., Chicago 12, Ill.—GA
Bludworth Marine, Div. National-Simplex-Bludworth, Inc., 100 Gold St., New York 7, N. Y.—SO
Boonton Radio Corp., 518 Main St., Boonton, N. J.—"Q-Meter"—"QX Checker"—SF, VO
Boulin Instrument Corp., 65 Madison Ave., New York 16, N. Y.—ST
Bowser, Inc., Terryville, Conn.—TT
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—CA
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—OD, SM
Burke & James, Inc., 321 S. Wabash Ave., Chicago 4, Ill.—OE
Cambridge Instrument Co., Inc., 3005 Grand Central Terminal, New York 17, N. Y.—RD, GA, OD, TO
Carborundum Co., Globar Div., Buffalo Ave., Niagara Falls, N. Y.—R
Cardwell, Allen D. Mfg. Corp., 81 Prospect St., Brooklyn 1, N. Y.—C
Carrier Corp., S. Geddes St., Syracuse, N. Y.—TT
Centralab, Division Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—C
Central Scientific Co., 1700 Irving Park Rd., Chicago 13, Ill.—GA
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—RD
Clarostat Mfg. Corp., 130 Clinton St., Brooklyn 2, N. Y.—RD
Clough-Brengle Co., 6014 Broadway, Chicago 40, Ill.—O, SA, SR
Collins Radio Co., Cedar Rapids, Iowa, EF, MV
Commercial Research Laboratories, Inc., 20 Bartlett Ave., Detroit 3, Mich.—O
Communication Equipment & Engineering Co., 5646 W. Race St., Chicago 44, Ill.—E, L
Communication Measurements Laboratory, 120 Greenwich St. New York 6, N. Y.—PR, ST
Communication Parts, 1101 N. Paulina St., Chicago 22, Ill.—RD, EF, L
Communications Equipment Corp., 134 W. Colorado St., Pasadena 1, Calif.—PU
Conn, C. G., Ltd., 1101 E. Beardsley Ave., Elkhart, Ind.—ST
Consolidated Engineering Corp., Pasadena 1, Calif.—S
Cordox Western, Inc., 151 North Ave., Los Angeles 31, Calif.—GA
Cornell-Dubilier Electric Corp., South Plainfield, N. J.—C, DC
Corning Glass Works, Corning, N. Y.—C
Crystal Research Products, Dumont, N. J.—MV, SR, SO
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.—ES
Cyclotron Specialties Co., Moraga, Calif.—GM
Daven Co., 191 Central Ave., Newark 4, N. J.—RD
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—GA, OE, R
Deepfreeze Div., Motor Products Corp., 2301 Davis St., North Chicago, Ill.—TT
DeMornay-Budd, Inc., 475 Grand Concourse, New York 51, N. Y.—RA, SW, SR
Determomm—Ohmite Mfg. Co.
Deutschmann, Tobe, Corp., Canton, Mass.—C, E, L
Dietert, Harry W., Co., 9330 Roselawn Ave., Detroit 4, Mich.—S
Distillation Products, Inc., 755 Ridge Road W., Rochester 13, N. Y.—GA, OE
Drake, R. L., Co., 11 Longworth St., Dayton 2, Ohio—E, EF, GA, L, MV, R, SO
Dumont, Allen B., Laboratories, Inc., 2 Main Ave., Passaic, N. J.—ES, O
Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—DC, RD, E, ES, O, SW, SA
Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—RD, ES, R, SA, SR, L
Eastern Specialty Co., 3617 N. 8th St., Philadelphia 40, Pa.—R
Eastman Kodak Co., Rochester 4, N. Y.—OE
Electric Heat Control Co., 9123 Inman Ave., Cleveland 5, Ohio—GA
Electrical Reactance Corp., Franklinville, N. Y.—C
Electro-Medical Laboratory, Inc., Holliston, Mass.—OD
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—RD, O, R
Electronic Engineering Co., 3223 W. Armitage Ave., Chicago 47, Ill.—L
Electronic Engrg. Service & Labs., 114-38 Farmers Blvd., St. Albans 12, N. Y.—ES, EF, MV, O, R, SW, SA, SR
Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—E, ES, EF, MV, S, ST
Electronic Measurements Co., Red Bank, N. J.—SR, SA, PR
Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—ES, O, S, SW, SA, SR
Electronic Transformer Co., 207 W. 25th St., New York, N. Y.—L
Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—O, PR, S, SO
Engelhard, Charles, Inc., 233 N. J. R. R. Ave., Newark 5, N. J.—GA
Engineering Laboratories, Inc., 610-624 E. 4th St., Tulsa 3, Okla.—OD, S
Espey Mfg. Corp., 528 E. 72nd St., New York 21, N. Y.—O W
Farrand Optical Co., Inc., Bronx Blvd. & E. 238th St., New York 66, N. Y.—OE, LE
Federal Mfg. & Engineering Corp., 199-217 Steuben St., Brooklyn 5, N. Y.—SR, OE
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—E, ES, L, R
Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20, N. Y.—E, EF, L
Ferris Instrument Co., 110 Cornelia St., Boonton, N. J.—CA, SR
Film Crafts Engineering Co., 36 W. 25th St., New York 10, N. Y.—LE, OE, ST
Fischer-Smith, Inc., 162 State St., West Englewood, N. J.—EB, GA
Fisher Research Laboratory, 1961 University Ave., Palo Alto, Calif.—EB
Fisher Scientific Co., 711 Forbes St., Pittsburgh, Pa.—GA, OE
Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.—LE, OE
Flashtron—Thordarson Electric Mfg. Co.
Freed Transformer Co., 72 Spring St., New York 12, N. Y.—E, EF
Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill.—LE, OE, S
Gamma Instrument Co., Inc., 95 Madison Ave., New York 16, N. Y.—OE
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—MV, SR
Gates, George W. & Co., Inc., Lucille Ave. & Hempstead Tpke., Franklin Square, L. I., N. Y.—OE
Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—ES, O, SW, SA, SR
General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—SR
General Control Co., 1200 Soldiers Field Rd., Boston 34, Mass.—ES
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—C, ES, SW, SA, SR
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—C, DC, RD, E, GM, L, MV, O, R, SA, SR, ST, SO, TO
Geophysical Instrument Co. 1820 N. Nash St., Arlington, Va.—GM, LE, MV, OE, SW
G & G Precision Works, Inc., 5-33 48th Ave., Long Island City 1, N. Y.—OE
Goodall Electric Mfg. Co., Third & Main Sts., Ogallala, Neb.—C, MV
Gussack Machined Products Co., 10-20 45th Rd., Long Island City 1, N. Y.—OE, SO
Gyro Balance Corp., 119 E. 36th St., New York 16, N. Y.—EB
Hallicrafters Co., 2611 S. Indiana Ave., Chicago 16, Ill.—MV
Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y.—C
Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N. J.—R
Harvey-Wells Electronics, North St., Southbridge, Mass.—DC, RD, L
Hathaway Instrument Co., 1315 S. Clarkson St., Denver, Col.—OD, TO
Heiland Research Corp., 130 E. Fifth Ave., Denver 9, Col.—GA, OD, O
Helipot Corp., 1015 Mission St., So. Pasadena, Calif.—S
Herbach & Rademan Co., Mfg. Division, 517 Ludlow, Philadelphia 6, Pa.—RD, ES, GM, L, MV, R, SW, SA, SR, TO
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—E, ES, L
Herron Optical Co., 705 W. Jefferson Blvd., Los Angeles 7, Calif.—OE
Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—ES, L, MV, RA, SW, SA, SR, SO, VO
Hickok Electrical Instrument Co., 10514 Dupont, Cleveland 8, Ohio—O, SA, SR
Hollywood Transformer Co., 11034 Blix St., N. Hollywood, Calif.—E, EF, L
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—FF, L, MV, SO
Industrial Filter & Pump Mfg. Co., 1621-25 W. Carroll Ave., Chicago 12, Ill.—SC
Industrial Instruments, Inc., 17 Pollock Ave., Jersey City, N. J.—C, DC, RD, L, R
Instrument Glass & Mirror Co., 383 Pearl St., Brooklyn 1, N. Y.—LE
Instrument Optics Co., 1872 Genesee St., Buffalo 11, N. Y.—OE
Intex Co., 303 W. 42nd St., New York 18, N. Y.—C
Islip Radio Mfg. Corp., Islip, N. Y.—EB, MV
Jackson Electrical Instrument Co., 18 S. Patterson Blvd., Dayton, Ohio—SR, O, SA
Jefferson, Ray, Inc., 40 E. Merrick Rd., Freeport, L. I., N. Y.—MV
Jensen Radio Mfg. Co., 6601 S. Laramie Ave., Chicago 38, Ill.—EF
Jerome Engineering Co., Massapequa, L. I., N. Y.—OE
J.F.D. Mfg. Co., 4111 Ft. Hamilton Parkway, Brooklyn 19, N. Y.—ST
Kenyon Transformer Co., Inc., 840 Barry St., New York 59, N. Y.—E, EF
Keystone Carbon Co., Inc., 1935 State St., St. Marys, Pa.—R
Kilburn, J. R., Glass Co., Inc., 22 S. Worcester St., Chartley, Mass.—LE
Kirkland, H. R. Co., 8-10 King St., Morristown, N. J.—LE
Knights, James Co., 131 S. Wells St., Sandwich, Ill.—OE
Kold-Hold Mfg. Co., 424 N. Grand Ave., Lansing 4, Mich.—TT
Lane-Wells Co., 5610 S. Soto St., Los Angeles 11, Calif.—O
Larrimore Sales Co., 311 Locust St., St. Louis 2, Mo.—OE
Lavoie Laboratories, Matawan-Freehold Rd., Morganville, N. J.—SR
Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—L, MV, SW, SR
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.—DC, RD, GA, S, L
Leitz, E., Inc., 730 Fifth Ave., New York 19, N. Y.—LE, OE
Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn.—DC, RD, ES
Lyman Electronic Corp., 12 Cass St., Springfield, Mass.—ES, MV
Maberg Optical, Inc., 235 E. 45th St., New York 17, N. Y.—OE
Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—C, E, EB, ES, O, R, SW, BO, PG, SA
Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—SR
Measurements Corp., 116 Monroe St., Boonton, N. J.—CA, PG, SF, SR, SW, VP
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—EF
Millen, James Mfg. Co., Inc., 150 Exchange St., Malden 48, Mass.—MV, O, RA
Miller, J. W. Co., 5917 S. Main St., Los Angeles 3, Calif.—L
Miller, William Corp., 362 Colorado St., Pasadena 2, Calif.—OE, OD
Miller Electro-Research Labs., 3460 S. 16th St., Milwaukee 7, Wis.—RD
Mogey, William & Sons, Inc., Interhaven Ave., Plainfield, N. J.—LE, OE
Monarch Mfg. Co., 2014 N. Major Ave., Chicago 39, Ill.—"Monarch"—MV, SR
Monitor Piezo Products Co., 815 Fremont Ave., So. Pasadena, Calif.—MV, SR
Moulic Specialties Co., 1005-1007 W. Washington St., Bloomington, Ill.—O
National Co., Inc., 61 Sherman St., Malden 48, Mass.—O
New York Transformer Co., 62 William St., New York 3, N. Y.—CA, DI, L
Nilsson Electrical Laboratory, Inc., 103 Lafayette St., New York 13, N. Y.—R
North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—GM, S
Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—E, EF
Northern Laboratories, Ltd., 3-01 27th Ave., Long Island City 2, N. Y.—TT
Nurnberg Thermometer Co., Inc., 112 Broadway, Cambridge 42, Mass.—TT
Offner Electronics, Inc., 5320 N. Kedzie Ave., Chicago 25, Ill.—OD
Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill.—"Determohm"—RD, R
Pacific Electronics. Sprague at Jefferson, Spokane, Wash.—MV
Panoramic Radio Corp., 242-250 W. 55th St., New York 19, N. Y.—RA
Parker Engineering Products Co., 16 W. 22nd St., New York, N. Y.—OE, R
Peerless Electrical Products Co., 6920-7004 McKinley Ave., Los Angeles 1, Calif.—EF
Perkin-Elmer Corp., 535 Hope St., Glenbrook, Conn.—LE, OE, S
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—O

Physicists Research Co., 343 S. Main St., Ann Arbor, Mich.—SM
Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.—GA
Plating Processes Corp., 109 Lyman St., Holyoke, Mass.—ES
Polytron Corp., 401 Broadway, New York 13, N. Y.—O, RA, SW, SA, SR
Potter Instrument Co., 136-56 Roosevelt Ave., Flushing, L. I., N. Y.—MV
Precision Apparatus Co., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y.—SR
Precision Electronics Co., 815 Washington St., Newtonville 60, Mass.—SR
Precision Scientific Co., 1750 N. Springfield Ave., Chicago 47, Ill.—GA, SC
Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—GA
Pyrometer Instrument Co., 103 Lafayette St., New York, N. Y.—OE
Q Meter—Boonton Radio Corp.
QX Checker—Boonton Radio Corp.
Radio Frequency Laboratories, Inc., Boonton, N. J.—SO
Radio Specialty Mfg. Co., 403 N.W. 9th St., Portland 9, Ore.—MV, SR
Radio Television Institute, Inc., 480 Lexington Ave., New York 17, N. Y.—PR
Rahm Instruments, Inc., 12 W. Broadway, New York 7, N. Y.—OD
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—SR
Rayzon, Inc., 407 N. Jackson St., Jackson, Mich.—SR
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—O, SW, SA, SR
Reeves Sound Laboratories, Div. Reeves-Ely Laboratories, Inc., 62 W. 47th St., New York, N. Y.—SO
Reiner Electronics Co., Inc., 152 W. 25th St., New York 1, N. Y.—SW
Revco, Inc., Refrigeration Div., Deerfield, Mich.—TT
Richardson-Allen Corp., 15 W. 20th St., New York 11, N. Y.—L
Rieber, Frank, Inc., 11916 W. Pico Blvd., Los Angeles 34, Calif.—E, EF, O, SR, TO
Robinson-Houchin Optical Co., 79 Thurman Ave., Columbus 6, Ohio—LE, TO
Rowe Radio Research Laboratory Co., 2422 N. Pulaski Rd., Chicago 39, Ill.—O
Rubicon Co., Ridge Ave. at 35th St., Philadelphia 32, Pa.—RD, GA, R
Sav-Way Industries, P. O. Box 117, Harper Sta., Detroit 13, Mich.—SM
Saxl Instrument Co., 38-40 James St., East Providence 14, R. I.—C, LE, OE, TT, SM
Scherr, George Co., Inc., 200 Lafayette St., New York 12, N. Y.—OE
Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—CA, SR
Scientific Service Laboratories, 915 Meridian Ave., S. Pasadena, Calif.—SA, SR
Shallcross Mfg. Co., Jackson & Pusey Aves., Collingdale, Pa.—RD
Sherron Electronics Co., 1201 Flushing Ave., Brooklyn 6, N. Y.—C, EB, GA, R, L
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—SW, SA
Simonds Machine Co., Inc., 246-48 Worcester St., Southbridge, Mass.—OE
Sipp-Eastwood Corp., 39 Keen St., Paterson, N. J.—CW
Skydyne, Inc., River Rd., Port Jervis, N. Y.—TT
Solar Capacitor Sales Corp., 285 Madison Ave., New York 17, N. Y.—C
S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N Y.—LE, OE
Square D Co., 6060 Rivard St., Detroit 11, Mich.—OE
Standard Instruments Corp., 568 Prospect Ave., New York 55, N. Y.—DC, DI, RD
States Co., 19 New Park Ave., Hartford 6, Conn.—R
Sta-Warm Electric Co., 333 N. Chestnut St., Ravenna, Ohio—OE
Stoelting, C. H. Co., 424 N. Homan Ave., Chicago 24, Ill.—GA, GM
Supreme Instruments Corp., Greenwood, Miss.—"Supreme"—SR
Swain Nelson Co., 2320 Glenview Ave., Glenview, Ill.—LE, OE
S-W Inductor Co., 1056 N. Wood St., Chicago 22, Ill.—L
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—C, ES, O, RA, SR, ST
Takk Corp., 28 W. Market St., Newark, Ohio—PU
Taller & Cooper, 75 Front St., Brooklyn 1, N. Y.—EB, GA
Tech Laboratories, 337 Central Ave., Jersey City 7, N. J.—RD, R, SO
Technical Apparatus Co., 1171 Tremont St., Boston 20, Mass.—C, DC, O, SA
Technical Devices Corp., Beaufort & Eagle Rock Ave., Roseland, N. J.—SR
Teleregister Corp., 157 Chambers St., New York 7, N. Y.—ST
Tenney Engineering, Inc., 26 Ave. B, Newark 5, N. J.—TT
Thompson, John E. Co., 1440 W. 47th St., Chicago 9, Ill.—MV, O, SW, SA, SR
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—"Flashtron"—EF
Thwing, Albert, Instrument Co., Penn St. & Pulaski Ave., Philadelphia 44, Pa.—DC, RD, ES
Times Telephoto Equipment, Inc., 229 W. 43rd St., New York 18, N. Y.—OE, TO
Transmitter Equipment Mfg. Co., Inc., 345 Hudson St., New York 14, N. Y.—SO
Trefz Mfg. Co., 38-11 Main St., Flushing, L. I., N. Y.—R
Triplett Electrical Instrument Co., Harmon Rd., Bluffton, Ohio—SR
Triumph Mfg. Co., 913 W. Van Buren St., Chicago 7, Ill.—O, SA, SR
Ullman Products Co., 857-61 4th Ave., Brooklyn 32, N. Y.—OE
Union Electronics Corp., 38-01 Queens Blvd., Long Island City, N. Y.—SA, SR
United Cinephone Corp., 65 New Litchfield St., Torrington, Conn.—ES
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—SM
U. S. Television Mfg. Corp., 3 W 61st St., New York 23, N. Y.—SR, VP
United Transformer Corp., 150 Varick St., New York 13, N. Y.—E, EF, L
Vacolite Co., 3001-3003 N. Henderson, Dallas, Tex.—SA
Valpey Crystal Corp., Highland St., Holliston, Mass.—OE
Vibrotest—Associated Research, Inc.
Walker, Robert, Inc., 403 W. 8th St., Los Angeles 14, Calif.—C, ES, MV, S
Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y.—R
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—LE
Waterman Products Co., Inc., 2445-63 Emerald St., Philadelphia 25, Pa.—O, SW, SA, SR, ST
Watlow Electric Mfg. Co., 1320 N. 23rd St., St. Louis 6, Mo.—R
Waugh Laboratories, 420 Lexington Ave., New York 17, N. Y.—L
Weber Co., Earl, 4352 W. Roosevelt Ave., Chicago, Ill.—SR
Welch, W. M. Mfg. Co., 1515 Sedgwick St., Chicago 10, Ill.—O, ST
Weltronic Co., 19500 W. Eight Mile Rd., Detroit 19, Mich.—S
Westinghouse Electric Corp., Meter Div., 95 Orange St., Newark 1, N. J.—OD
Westinghouse Electric Corp., East Pittsburgh, Pa.—C, GA, OD, O, TT, R, SW, ST, SO, SM
Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—L
Winslow Co., 9 Liberty St., Newark 5, N. J.—DC, RD, GA, R
Winters & Crampton Corp., Grandville, Mich.—C
World Wide Electronics, Inc., 72 E. 13th St., New York 3, N. Y.—EB, L
York Electric & Machine Co., Carrillotone Div., 30-34 N. Penn St., York, Pa.—TT, SM
Zeiss, Carl, Inc., 485 Fifth Ave., New York 17, N. Y.—OE
Zenith Optical Laboratory, 123 W. 64th St., New York 23, N. Y.—OE

(19) Machinery & Production Equipment



Air cleaners ..... AC
Bench lathes L
Blower units ..... B
Buffers and grinders ..... G
Coil winding machines ..... CW
Crystal grinders ..... CG
Crystal lapping discs ..... LD
Crystal saw blades C
Dies ..... D
Drill press ..... P
Electric furnaces ..... E
Engraving machines ..... EM
Impregnating equipment ..... IM
Jigs and fixtures ..... J
Marking and numbering machines ..... MN
Metal forming equipment ..... MF
Mfg. facilities ..... MG
Molding presses ..... MP
Powdered metal press ..... PM
Pressure welding electrodes ..... PW
Punch press ..... PP
Quartz cutting machines ..... QC
Riveter, automatic ..... R
Soldering machines ..... SM
Spot welders ..... S
Strain gages ..... SG
Vacuum pumps ..... VP
Vacuum tube machinery ..... VM
Vibration control equipment VC
Wire insulating machine ..... WI
X-Ray, pattern markers X

Ace Mfg. Corp., Erie Ave. at "K" St., Philadelphia 24, Pa.—D, J
Acme-Danneman Co., Inc., 203-205 Lafayette St., New York 12, N. Y.—D, J
Acme Tool & Die Co., 426 Ingle St., Evansville 8, Ind.—D, J
Acromark Co., 9-13 Morrell St., Elizabeth 4, N. J.—D, J, MN
Acro Tool & Die Works, 4554 Broadway, Chicago 40, Ill.—J
Agnew Electric Co., Milford, Mich.—S
Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.—VM
Aircraft & Diesel Equipment Corp., 4401 N. Ravenswood Ave., Chicago 40, Ill.—B
Air-Maze Corp., 5200 Harvard Ave., Cleveland 5, Ohio—AC
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.—E
Allen Electric & Equipment Co., 2101-2117 N. Pitcher St., Kalamazoo 13-f, Mich.—S
Allis-Chalmers Mfg. Co., P. O. Box 512, Milwaukee 1, Wis.—VP
All-Steel Equipment Co., 723 Griffith Ave., Aurora, Ill.—MF
American Electric Fusion Corp., 2610 W. Diversey Ave., Chicago 47, Ill.—S
American Instrument Co., 8030 Georgia Ave., Silver Spring, Md.—SG
Ams, Max, Machine Co., Foot of Scofield Ave., Bridgeport 5, Conn.—MF
Andrews & Perillo, 39-30 Crescent St., Long Island City, N. Y.—D, J, MF
Annis, R. B., Company, 1101 N. Delaware St., Indianapolis 2, Ind.—MN, VC
Arnessen Electric Co., Inc., 116 Broad St., New York 4, N. Y.—D, J
Atlas Metal Stamping Co., 3801 Castor Ave., Philadelphia 24, Pa.—D, J
Austin, O., Co., 335 Throop Ave., Brooklyn 21, N. Y.—MN
Auto Engraver Co., 1776 Broadway, New York 19, N. Y.—EM
Automatic Mfg. Corp., 900 Passaic Ave., East Newark, N. J.—PP
Baird Machine Co., 1700 Stratford Ave., Stratford 9, Conn.—MF
Baker Instrument Co., 310 Main St., Orange, N. J.—E
Baldwin Locomotive Works, Baldwin Southwark Div., Paschall P. O., Philadelphia 42, Pa.—MP, PM, SG
Barrett, Leon J. Co., P. O. Box 378, Worcester 1, Mass.—IM
Barry, L. N. Co., 179 Sidney St., Cambridge 39, Mass.—VC
Bear Mfg. Co., Rock Island, Ill.—VC
Bellows Co., 861 E. Tallmadge Ave., Akron 10, Ohio—AC, B
Bennel Machine Co., Inc., 20 Grand Ave., Brooklyn, N. Y.—J, MF
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—CW, MN
Black & Decker Mfg. Co., E. Pennsylvania Ave., Towson 4, Md.—G
Bliss, E. W., Co., 53rd St. & 2nd Ave., Brooklyn 32, N. Y.—MF, MP, PM
Browne, J. Electric Co., 3774 Surf Ave., Brooklyn 24, N. Y.—MF, R
Brush Development Co, 3405 Perkins Ave., Cleveland 14, Ohio—SG
Burgess Battery Co., Handicraft Div., Vibro Tool Dept., 180 N. Wabash Ave., Chicago 1, Ill.—MN
Callite Tungsten Corp., 540 39th St., Union City, N. J.—PW
Carpenter Products, Inc., 85 Washburn St., Bridgeport, Conn.—S
Central Scientific Co., 1700 Irving Park Rd., Chicago 13, Ill.—VP
Chicago Rivet & Machine Co., 9600 W. Jackson Blvd., Bellwood, Ill.—R
Clark, Jas. Jr. Elec Co., 600 Bergman St., Louisville 2, Ky.—G
Clark, Robert H. Co., 9330 Santa Monica Blvd., Beverly Hills, Calif.—QC
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio—S
Congress Tool & Die Co., Congress Die Casting Div., 3750 E. Outer Dr., Detroit, Mich.—D, J, MF
Consolidated Diamond Tool Co., 320 Yonkers Ave., Yonkers, N. Y.—C
Consolidated Engineering Corp., Pasadena 1, Calif.—SG
Crescent Industries, Inc., 4140 Belmont Ave., Chicago 41, Ill.—D
Dalions Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—E
Daly Machine & Tool Works, 923 Frelinghuysen Ave., Newark, N. J.—J
Davidson Fan Co., 213 California St., Newton, Mass.—B
Davies, Harry, Molding Co., 1428 N. Wells St., Chicago 10, Ill.—J
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—D, J
Denham & Co., Book Bldg., Detroit 26, Mich.—MN
DeSanno, A. P. & Son, Inc., Phoenixville, Pa.—G
Despatch Oven Co., 619 S.E. Eighth St., Minneapolis 14, Minn.—E
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.—B, G

Distillation Products, Inc., Vacuum Equipment Div., 755 Ridge Road W., Rochester 13, N. Y.—IM, VP, VM
Do-All Co., 1301 Washington Ave., S., Minneapolis 4, Minn.—D, MF, G, MN
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—D, P, E, J, MN, MF, MP, S
Dynamic Air Engineering, Inc., 1619 S. Alameda St., Los Angeles 21, Calif.—B
Ecco High Frequency Corp., 7020 Hudson Blvd., North Bergen, N. J.—VM
Edwards, T. J., Inc., 210 South St., Boston 5, Mass.—D, MN
Eisler Engineering Co., 750 S. 13th St., Newark 3, N. J.—B, CW, E, PW, S, VP, VM
Eitel-McCullough, Inc., San Bruno, Calif.—VP
Electric Coding Machine Co., 57 Franklin St., New York 13, N. Y.—MN
Electric Furnace Co., West Wilson St., Salem, Ohio—E
Electric Heat Control Co., 9123 Inman Ave., Cleveland 5, Ohio—S
Electrix Corp., 150 Middle St., Pawtucket, R. I.—D, J, MF
Electro Mag. Mfg. Co., 610 N. Rockford Ave., Rockford, Ill.—MN
Electronic Mfg. Co., 20 Orange St., Newark 2, N. J.—D, J, VM
Ess Instrument Co., 963 Washington St., Bergenfield, N. J.—SM
Felker DiMet—Felker Mfg. Co.
Felker Mfg. Co., 1128 Border Ave., Torrance, Calif.—"Felker DiMet"—LD, C, QC
Foredom Electric Co., 27 Park Place, New York 7, N. Y.—G
Foxboro Co., Foxboro, Mass.—SG
Fredericks, George E. Co., Bethayres, Pa.—VP
Fuchs, Charles A., 13-15 Mollineaux Pl., Roosevelt, L. I., N. Y.—J
Gardiner Mfg. Co., 2711 Union St., Oakland 7, Calif.—G, CW, J, MF
Gatti, Aurele M., Inc., 1909 Liberty St., Trenton 9, N. J.—G
General Electric Co., 1 River Rd., Schenectady 5, N. Y.—SG
General Tire & Rubber Co., Garfield, Wabash, Ind.—VC
General Winding Co., 420 W. 45th St., New York 19, N. Y.—CW, IM
Giannini, G. M. & Co., Inc., Autoflight Instrument Div., 4522 Lankershim Blvd., N. Hollywood, Calif.—SG
Gisholt Machine Co., 1125 E. Washington Ave., Madison 3, Wis.—J, MF, VC
Goodall Electric Mfg. Co., 3rd & Main Sts., Ogallala, Neb.—AC, CW, CG, LD, C, P, IM, J, MN, MF, MP, QC, SM, S, VM, VC
Graham Rotary File Co., 4816 Tacony St., Philadelphia 37, Pa.—G
Hadley, Robert M. Co., 707-711 E. 61st St., Los Angeles 1, Calif.—CW, D, J
Hannon Electric Co., 1605 Waynesburg Rd., S.E., Canton, Ohio—AC, B, G, CW, E
Harper Electric Furnace Corp., Niagara Falls, N. Y.—E
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—D, J
Hathaway Instrument Co., 1315 S. Clarkson St., Denver 10, Colo.—SG
Haydu Bros., P. O. Box 1226, Plainfield, N. J.—B, VP, VM
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N Y.—S
Hoffman, P. R., Co., 321 Cherry St., Carlisle, Pa.—CG, LD, QC
Hovis Screwlock Co., 8100 E. Nine Mile Rd., Van Dyke, Mich.—D
Hydraulic Press Mfg. Co., Mt. Gilead, Ohio—PM
Hydraulic Tool & Die Corp., 4625 Third Ave., New York 57, N. Y.—D, J
Ideal Industries, Inc., 5194 Park Ave., Sycamore, Ill.—AC, B, CW
Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago 41, Ill.—B
Infra-Red Engineers & Designers, E. 73rd & Grand Ave., Cleveland 4, Ohio—E
International Machine Works, 2027 48th St., North Bergen, N. J.—VP, VM
Johns-Manville Sales Corp., 22 E. 40th St., New York 16, N. Y.—VC
Kaddis, A. G., Screw Products Co., Inc., 42 Allen St., Rochester 6, N. Y.—MG
Kahle Engineering Co., 1307 7th St., North Bergen, N. J.—E, MN, VP, VM
Keystone Electronics Co., 50-52 Franklin St., New York 13, N. Y.—J
Kinney Mfg. Co., 3595 Washington St., Boston 30, Mass.—VP
Knight, H. W., & Son, Inc., 96 State St., Seneca Falls, N. Y.—X
Kollath Mfg. Co., 4601 W. Addison St., Chicago, Ill.—D, J, MF
Kux Machine Co., 3040 W. Harrison St., Chicago 24, Ill.—MF, MP, PM
L.A.B. Corp., 31 Union Place, Summit, N. J.—VC
Leiman Bros., Inc., 203 Christie St., Newark 5, N. J.—B, CG, VP
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y.—E
Lewyt Corp., 60 Broadway, Brooklyn 11, N. Y.—MG
Linick, Leslie L., 29 E. Madison St., Chicago, Ill.—L, MF
Litton Engineering Laboratories, P. O. Box 749, Redwood City, Calif.— S, VP, VM
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.—VC
L-R Mfg. Co., Div. of Ripley Co., 65 New Litchfield St, Torrington, Conn.—B
Luma Electric Equipment Co., P. O. Box 132, Toledo 1, Ohio—MN
Lyman Electronic Corp., 12 Cass St., Springfield, Mass.—J
Magnetic Products Co., Norwalk, Conn.—CW
Mallory, P. R. & Co., Inc., 3029 E. Washington St., Indinapolis 6, Ind.—PW
Markem Machine Co., Emerald St., Keene, N H.—MN
Marlboro Tool & Mfg. Co., Charles St. & New Brunswick Ave., Matawan, N. J.—VM
Martindale Electric Co., Box 617, Edgewater Branch, Cleveland 7, Ohio—G
Mattern, F. Mfg. Co., 4647 N. Sicero Ave., Chicago 30, Ill.—X
Matthews, Jas. H. & Co., 3729 Belmont Ave., Chicago 18, Ill.—D, J, MN
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—CW
Mico Instrument Co., 80 Trowbridge St., Cambridge 38, Mass.—CW, EM
Miles Reproducer Co., Inc., 612 Broadway, New York 3, N. Y.—CW
Milford Rivet & Machine Co., Eastern Div., Milford, Conn.—B
Mogey, William & Sons, Inc., Interhaven Ave., Plainfield, N. J.—G
Monitor Piezo Products Co., 815 Fremont Ave., So. Pasadena, Calif.—C, LD, CG
Montgomery Bros., 20 E. Jackson Blvd., Chicago, Ill.—AC
Morey Machinery Co., Inc., 4-57 26th Ave., Astoria 2, L. I., N. Y.—L
Morse Twist Drill & Machine Co., 163 Pleasant St., New Bedford, Mass.—D
National Gasket & Washer Mfg. Co., 122 E. 25th St., New York 10, N. Y.—LD
National Research Corp., 100 Brookline Ave., Boston 15, Mass.—IM, VP, VM
N. J. Jewelers Supply, 280 Plane St., Newark 2, N. J.—S
New Jersey Machine Corp., Willow Ave. at 16th St., Hoboken, N. J.—MN, VP
New Method Steel Stamps, Inc., 147 Jos. Campau St., Detroit 7, Mich.—MN
New York Blower Co., 3155 S. Shields, Chicago, Ill.—B
North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—D
Norton Co., 1 New Bond St., Worcester 6, Mass.—G, CG, C
Numberall Stamp & Tool Co., Huguenot Park, Staten Island 12, N. Y.—MN
Nurnberg Thermometer Co., Inc., 112 Broadway, Cambridge 42, Mass.—IM, VP
OK Machine Co., 2131 Fairfield Ave., Ft. Wayne 6, Ind.—D, J, MF
O'Neil-Irwin Mfg. Co., 316 Eighth Ave. S, Minneapolis 15, Minn.—MF
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.—PP
Peerless Roll Leaf Co., Inc., 4511 New York Ave., Union City, N. J.—MN
Penn Fibre & Specialty Co., 2024 to 2030 E. Westmoreland St., Philadelphia 34, Pa.—D
Pratt & Whitney, Div. of Niles-Bement-Pond Co., West Hartford, Conn.—L, SG
Preco, Inc., 960 E. 61st St., Los Angeles 1, Calif.—MP
Preis, H. P., Engraving Machine Co., 155 Summit St., Newark 4, N. J.—G, EM, MN
Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—E
Production Devices, Inc., N. William St., Whitehall, N. Y.—J, MF, MP
Production Engineering Corp., 666 Van Houten Ave., Passaic, N. J.—IM

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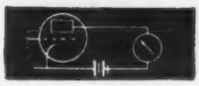
This Directory of radio-electronic - television sources of supply is most complete and up-to-date, having been totally compiled and revised during 1946, with a final check-survey of manufacturers and their products completed as late as March and April of the present year.

Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.—S
Promenette Radio & Television Corp., 1721 Elmwood Ave., Buffalo 7, N. Y.—SM
Quad Mfg. Co., 462 N. Parkside Ave., Chicago 44, Ill.—CW, D
Quality Hardware & Machine Corp., 5849 N. Ravenswood Ave., Chicago 26, Ill.—C, J
Radiad Service, 720 W. Schubert Ave., Chicago 14, Ill.—D, J
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—S
RCA Victor Div., Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—E, J, MN, MF, VM
Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—D
Reynolds Electric Co., 2650 W. Congress St., Chicago 12, Ill.—G
Rice's Sons, Bernard, 325 Fifth Ave., New York 16, N. Y.—J
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—VC
Sav-Way Industries, P. O. Box 117, Harper Station, Detroit 13, Mich.—G, MP
Saxl Instrument Co., 38-40 James St., East Providence 14, R. I.—J, SG
Schauer Machine Co., 2060 Reading Rd., Cincinnati 2, Ohio—G
Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill.—S
Sexton Can Co., Inc., 31 Cross St., Everett 49, Mass.—MF
Sherron Electronics Co., 1201 Flushing Ave., Brooklyn 6, N. Y.—MG
Simonds Machine Co., Inc., 246-48 Worcester St., Southbridge, Mass.—D, J
Sittler Mfg. Corp., 18 N. Ada St., Chicago 7, Ill.—G
Smith, F. A., Mfg. Co., Union & Augusta, Rochester 2, N. Y.—B
Smith, Nathan R. Mfg. Co., 105 Pasadena Ave., South Pasadena, Calif.—D
Special Devices Co., Farmington Ave., Berlin, Conn.—P, J
Special Machine Tool Engrg. Works, 132 Lafayette St., New York 13, N Y.—MG
Sperman Metal Specialties, 2199 E. 21st St., Brooklyn 29, N. Y.—D, J, MF
Standard Electrical Tool Co., 2488 River Rd., Cincinnati 4, Ohio—AC, L, G
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.—CW, MF
Starrett, L. S., Co., Athol, Mass.—SG
Sta-Warm Electric Co., 333 N. Chestnut St., Ravenna, Ohio—IM
Stedman, Robert L., E. Main St., Oyster Bay, N. Y.—J
Stevens Machinery Co., 1461 W. Grand Ave., Chicago 22, Ill.—CW
Stevenson, Jordan & Harrison, Inc. (Electronic Power Co.), 19 W. 44th St., New York 18, N. Y.—S
Stokes, F. J., Machine Co., 6054 Tabor Rd., Philadelphia 20, Pa.—MP, PM, VP
Stricker-Brunhuber Co., 19 W. 24th St., New York 10, N. Y.—J
Sturtevant, B. F., Co., Damon, Hyde Park, Boston 36, Mass.—B
Swanson Tool & Machine Products, 810-14 E. 8th St., Erie, Pa.—D, J, VM
Taylor-Winfield Corp., 1052 Mahoning Ave., N.W., Warren, Ohio—S
Thermo Electric Mfg. Co., 480 W. Locust St., Dubuque, Iowa—E
Thomas & Skinner Steel Products Co., 1120 E. 23rd St., Indianapolis 5, Ind.—D
Trane Co., 3rd & Cameron Ave., LaCrosse, Wis.—B
Trent, Harold E., Co., 5005 Wilde St., Philadelphia 27, Pa.—E, VM
Tubular Rivet & Stud Co., Wollaston 70, Mass.—R
Tweezer-Weld Corp., 280 Plane St., Newark 2, N. J.—S
U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles, Calif.—G
U. S. Electrical Tool Co, 1050 Findlay St., Cincinnati 14, Ohio—G
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—VC
U. S. Tool Co., Inc., 255 N. 18th St., Ampere, N. J.—MF
Universal Winding Co., 1655 Elmwood Ave., Cranston 7, R. I.—CW
Universal X-Ray Products, Inc., 1800 N. Francisco Ave., Chicago 47, Ill.—VP, VM
Vacuum Engineering Div., National Research Corp., 100 Brookline Ave., Boston 15, Mass.—VP
Volynsky, Boris M., Mfg. Co., Inc., 311 W. 66th St. New York 23, N. Y.—L, J, QC
Vonnegut Moulder Corp., 1815 Madison Ave., Indianapolis 2, Ind.—CG
Wadsworth Watch Case Co., Inc., Dayton, Ky.—D, I
Walker-Turner Co., Inc., 639 South Ave., Plainfield, N. J.—L, G, P
Waugh Laboratories, 420 Lexington Ave., New York 17, N. Y.—VC, SG
Welch, W. M., Mfg. Co., 1515 Sedgwick St., Chicago, 10, Ill.—VP
Westinghouse Elec. Corp., East Pittsburgh, Pa.—AC, B, E, J, PW, S, VP, VC, X, L
Whistler, S. B., & Sons, Inc., 752 Military Rd., Buffalo 17, N. Y.—D
Wiedemann Machine Co., 1815 W. Sedgley Ave., Philadelphia 32, Pa.—PP
Wincharger Corp., E. 7th at Division, Sioux City 6, Iowa—G
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—MN
Zetka Laboratories, Inc., 198-10-12 32nd Ave., Bayside, N. Y.—VM

(20) Measurement & Test Equipment



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Bridges ..... B
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Distortion meters ..... D
Electric dimension gage ..... EG
Electric micrometer ..... EM
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Tachometer ..... TA
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Thermometers & pyrometers ..... T
Time measurement ..... TM
Trans. measuring set ..... TR
Tube testers ..... TT
Tuning forks ..... TF
Vacuum gages ..... VG
Vac. tube voltmeters ..... VT
Vibration measuring equip. ..... VM
Volume indicators VI
Voltmeters V
Watt-hour meters ..... WH
Watt meters ..... W
Wave analyzers ..... WA
Wave meters ..... WM

Ace Mfg. Corp., Erie Ave. at K St., Philadelphia 24, Pa.—MP

Adrem Co., 143 Newbury St., Boston 16, Mass.—AD

Advance Research Corp., 214 W. 42nd St., New York, N. Y.—C, L, RM, S, WA

Aerovox Corp., 740 Belleville Ave., New Bedford, Mass.—B, H, IT, MO

Airplane & Marine Instruments, Inc., Clearfield, Pa.—B, F, WM

Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—FM

Alden Products Co., 117 North Main St., Brockton 64, Mass.—AD

All American Tool & Mfg. Co., 1014 W. Fullerton Ave., Chicago 14, Ill.—VM

Allen Electric & Equipment Co., 2101-2117 N. Pitcher St., Kalamazoo 13-F, Mich.—BT, PM, TA, VG

Alnor—Illinois Testing Laboratories, Inc.

American Communications Corp., 306 Broadway, New York, N. Y.—IT

American Electronics, 37 E. 18th St., New York 3, N. Y.—TT

American Instrument Co., 8030-8050 Georgia Ave., Silver Spring, Md.—H, MO

American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—B, P, QE, VT

American Thermo-Electric Co., 67 E. 8th St., New York 3, N. Y.—TH

American Time Products, Inc., 580 Fifth Ave., New York 19, N. Y.—TM, TF

American Transformer Co., Inc., 178 Emmet St., Newark 5, N. J.—H

Amplo Corp., 4224 Lincoln Ave., Chicago 18, Ill.—MM, M, T

Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—H, P, VI

Andrew Co., 363 E. 75th St., Chicago 19, Ill.—P

Annis, R. B. Co., 1101 N. Delaware St., Indianapolis 2, Ind—PM, TR, VM

Applied Research Laboratories, 4336 San Fernando Rd., Glendale 4, Calif.—PE

Askania Regulator Co., 1603 S. Michigan Ave., Chicago 16, Ill.—PM

Associated Research, Inc., 231 S. Green St., Chicago 7, Ill.—A, H, IT, MO, M, O, TA

Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—AF, EG, FS, S, TR

Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—IC

Automatic Pump & Softener Corp., 2412 Grant St., Rockford, Ill.—C

Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44, Pa.—TM

Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio—"Pyrotron"—T

Baker & Co., Inc., 113 Astor St., Newark 5, N. J.—TH

Baker Instrument Co., 310 Main St., Orange, N. J.—C

Baldwin Locomotive Works, Baldwin Southwark Div., Paschall P. O., Philadelphia 42, Pa.—B, PM, ST

Ballantine Laboratories, Inc., Boonton, N. J.—VT, V

Barber, Alfred W. Laboratories, 34-04 Francis Lewis Blvd., Flushing, L. I., N. Y.—VT

Barker & Williamson, Upper Darby, Pa.—D, E, F, FM, VT, VI, WM

Barnes, Wallace Co., P. O. Box 1521, Bristol, Conn.—MP

Bay Products Corp., 171 Camden St., Boston 18, Mass.—TM

Bendix Radio Division, Bendix Aviation Corp., East Joppa Rd., Baltimore 4, Md.—F, FM, P

Biddle, James G. Co., 1211 Arch St., Philadelphia 7, Pa.—FM, IT, MO, O, TA

Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—W

R. H. Bird & Co. Inc., 23 Moody St., Waltham, Mass.—MP

Boes, W. W. Co., 3001 Salem Ave., Dayton 3, Ohio—A, G, L, O, TH, V, VI

Boonton Radio Corp., 518 Main St., Boonton, N. J.—QE

Boulin Instrument Corp., 65 Madison Ave., New York 16, N. Y.—TA

Bowser, Inc., Terryville, Conn.—VI

Bristol Co., Waterbury 91, Conn.—AF, PH, PM, TA, TH, T, TM, TR, VG, V

Brown Engineering Co., 4635 S. E. Hawthorne Blvd., Portland 15, Ore.—B

Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., 4515 Wayne Ave., Philadelphia 44, Pa.—TA, TN, T, TH

Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—C, FM, FR

Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—G, PM, TR

Bunnell, J. H. & Co., 81 Prospect St., Brooklyn 1, N. Y.—TF

Burlington Instrument Co., N. Fourth St., Burlington, Iowa—A, M, S, VI, V

Burnett, Wm. W. L. Radio Lab., 4814 Idaho St., San Diego 4, Calif.—FM

Burton-Rogers Co., 857 Boylston St., Boston 16, Mass.—A, B, H

Cambridge Instrument Co., Inc., 3005 Grand Central Terminal, New York 17, N. Y.—B, E, G, PH, T, TF, VM

Cardwell, Allen D. Mfg. Corp., 81 Prospect St., Brooklyn 1, N. Y.—FM

Carson Micrometer Corp., P. O. Box 57, Little Falls, N. J.—EM

Centralab Division, Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—BT

Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—AM, B, TR, VI

Clippard Instrument Laboratory, 1440 Chase Ave., Cincinnati 23, Ohio—A, MP

Clough-Brengle Co., 6014 N. Broadway, Chicago 40, Ill.—A, B, M, O, TR, TT, V

Coleman Electric Co., 318 Madison St., Maywood, Ill.—PH

Collins Radio Co., Cedar Rapids, Iowa—FM, VI

Colloid Equipment Co., Inc., 50 Church St., New York 7, N. Y.—PH

Columbia Electric Mfg. Co., 4519 Hamilton Ave., N. E., Cleveland 14, Ohio—"Tong Test"—A

Commercial Research Labs., Inc., 20 Bartlett Ave., Detroit 3, Mich.—PH

Communication Equipment & Engineering Co., 5646 W. Race St., Chicago 44, Ill.—AM, TR

Communication Measurements Laboratory, 120 Greenwich St., New York 6, N. Y.—B, G, IT, MO, R

Communication Parts, 1101 N. Paulina St., Chicago 22, Ill.—QE

Communications Equipment Corp., 134 W. Colorado St., Pasadena 1, Calif.—VM

Conant Electrical Laboratories, 6500 "O" St., Lincoln 5, Nebr.—MP

Conn, C. G. Ltd., 1101 E. Beardsley Ave., Elkhart, Ind.—FM, TA, VM

Connecticut Telephone & Electric, Div. Great American Industries, Inc., Meriden, Conn.—IT, N

Consolidated Engineering Corp., Pasadena 1, Calif.—VM

Continental Electric Co., 715 Hamilton St., Geneva, Ill.—VG

Corbin Screw Division, American Hardware Corp., High, Myrtle & Grove Sts., New Britain, Conn.—TA

Cornell-Dubilier Electric Corp., So. Plainfield, N. J.—B

Cover Dual Signal Systems, Inc., Div. Electra-Voice Corp., 5215 N. Ravenswood Ave., Chicago 40, Ill.—B

Cramer, R. W. Co., Inc., Centerbrook, Conn.—TM

Crystal Research Laboratories, Inc., 29 Allyn St., Hartford 3, Conn.—FM

Crystal Research Products, Dumont, N. J.—FM

Cyclotron Specialties Co., Moraga, Calif.—IC, TM

Daven Co., 191 Central Ave., Newark 4, N. J.—AM, FM, OM, TR, VI

Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—H, IT, M, O, R, TT, VG, VT

DeJur Amsco Corp., Northern Blvd. at 45th St., Long Island City 1, N. Y.—A, L, V

DeMornay-Budd, Inc., 475 Grand Concourse, New York 51, N. Y.—AM, FM, WM

Deutschmann, Tobe Corp., Canton, Mass.—AM, B, FM, FS, H, MO

DeWald Radio Mfg. Corp., 440 Lafayette St., New York 3, N. Y.—FM, M

Diamond Instrument Co., North Ave., Wakefield, Mass.—FM, WM

Dickson Co., 7420 Woodlawn Ave., Chicago 19, Ill.—T

Dietert, Harry W. Co., 9330 Roselawn Ave., Detroit 4, Mich.—PE

Dillon, W. C. & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill.—ST, T

Distillation Products, Inc., Vacuum Equipment Div., 755 Ridge Road, W., Rochester 13, N. Y.—IC, IG, TH, VG

Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—A, B, MP

Dongan Electric Mfg. Co., 2987 Franklin St., Detroit 7, Mich.—IT

Doolittle Radio, Inc., 7421-23 S. Loomis Blvd., Chicago 36, Ill.—D, FM

Drake, R. L. Co., 11 Longworth St., Dayton 2, Ohio—EH, E, F, IG, PH, P

Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—B, FM, M

Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—B, FM, M, O, QE, R, S, TT, VT, VI, V

Eastern Specialty Co., 3617 N. 8th St., Philadelphia 40, Pa.—MP, WH

Ecco High Frequency Corp., 7020 Hudson Blvd., North Bergen, N. J.—VG

Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.—PM

Eitel-McCullough, Inc., San Bruno, Calif.—IG

Electric Heat Control Co., 9123 Inman Ave., Cleveland 5, Ohio—BT, H, TA

Electrical Facilities, Inc., 4224 Holden St., Oakland 8, Calif.—V

Electro Products Laboratory, 549 W. Randolph St., Chicago 6, Ill.—FM, PM, VM

Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—A, AF, BT, B, FM, FS, G, H, MP, IT, L, MO, M, O, PH, P, R, TA, TH, T, TM, TT, VT, VI, V, WH, W

Electronic Development Co., 1336 N. Saddle Creek Rd., Omaha 3, Nebr.—A, AF, AM, BT, EG, EM, G, MO, M, O, R, TA, TH, T, V

Electronic Engrg. Service & Labs., 114-38 Farmers Blvd., St. Albans 12, L. I., N. Y.—B, F, FM, QE, VT

Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—B, C, EG, EM, FM, IC, L, PM, TM, VM

Electronic Measurements Co., Red Bank, N. J.—D, F, FM, H, QE, R, TM, VT, WA

Electronic Plumbing Corp., 311 Neoperhan Ave., Yonkers 2, N. Y.—WM

Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—B, F, FM, MO, M, O, PH, P, VG, VT, WM

Electronic Research & Mfg. Corp., 5805 Hough Ave., Cleveland 3, Ohio—VT

Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—F, FM, R, TR, VT, WM

Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—F

Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—MP, PM, TA, TT, VM

Elematic Equipment Corp., 6046 S. Wentworth Ave., Chicago 21, Ill.—AF, T

Elgin National Watch Co., 107 National St., Elgin, Ill.—MP

Engelhard, Charles, Inc., 233 N. J. R. R. Ave., Newark 5, N. J.—AF, TH, T, G, V

Engineering Laboratories, Inc., 610-624 E. 4th St., Tulsa 3, Okla.—VC, FM, FS, G, MP, IG, PM, S, VM

Eppley Laboratory, Inc., 12 Sheffield Ave., Newport, R. I.—B, TH

Erco Radio Laboratories, Inc., 231 Main St., Hempstead, L. I., N. Y.—FM, WM

Ericsson Screw Machine Products Co., Inc., 25 Lafayette St., Brooklyn 1, N. Y.—MP

Esterline-Angus Co., Inc., P. O. Box 596, Indianapolis, Ind.—A, TM, V, W

Fada Radio & Electric Mfg. Co., Inc., 30-20 Thomson Ave., Long Island City 1, N. Y.—F, FM, O, VT, VI

Farrand Optical Co., Inc., Bronx Blvd. & E. 238th St., New York 66, N. Y.—PE

Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—AM, BT, TR, TT

Felsenthal, G. & Sons, 4108 W. Grand, Chicago 51, Ill.—MP

Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20, N. Y.—A, E, H, IT, V, WH

Ferris Instrument Co., 110 Cornelia St., Boonton, N. J.—F, FM, VT, V

Field Electrical Instrument Co., 109 E. 184th St., New York 53, N. Y.—TH

Film Crafts Engineering Co., 36 W. 25th St., New York 10, N. Y.—G, PE

Fischer-Smith, Inc., 162 State St., West Englewood, N. J.—TA

Fisher Scientific Co., 711 Forbes St., Pittsburgh, Pa.—PH, G

Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.—C, RM

Ford Radio & Mica Corp., 536 63rd St., Brooklyn 20, N. Y.—BT

Fordham Mfg. Co., 2736 Creston Ave., New York 58, N. Y.—BT, N

Fredericks, George E. Co., Bethayres, Pa.—IG, VG

Freed Radio Corp., 200 Hudson St., New York, N. Y.—F

Freed Transformer Co., 72 Spring St., New York 12, N. Y.—B, D, MO

rriez Instrument Div., Bendix Aviation Corp., Taylor Ave. near Loch Raven Blvd., Baltimore 4, Md.—T

Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill.—TM, TF

Gamma Instrument Co., Inc., 95 Madison Ave., New York, N. Y.—PH

Gardner, Henry A. Laboratory, Inc., 4723 Elm St., Bethesda 14, Md.—RM

Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—FM

Gatti, Aurele M. Inc., 1909 Liberty St., Trenton 9, N. J.—MP

Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—BT, B, F, FM, M, N, O, TT, VT, V, WM

General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—N

General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—FM, L, QE, TT

General Control Co., 1200 Soldiers Field Rd., Boston 34, Mass.—EG, EM

General Electric Co., 1 River Rd., Schenectady 5, N. Y.—VG, OM

General Electric Co., 1285 Boston Ave., Bridgeport 2, Conn.—BT

General Electric Co., Nela Specialty District, 1 Newark St., Hoboken, N. J.—N

General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—F, FM, M, R, TH, TT, WM

General Electronic Mfg. Co., 2225 S. Hoover St., Los Angeles 7, Calif.—OM, TH, O, A

General Electronics, Inc., 101 Hazel St., Paterson, N J.—IG

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—AM, B, D, FM, IC, MP, IT, MO, S, TA, TM, TF, VT, VM, V, WA, WM, MM, OM

Geophysical Instrument Co., 1820 N. Nash St., Arlington, Va.—G, MP, VM

Gibbs, Thomas B. & Co., Delaven, Wis.—TF

Giannini, G. M. & Co., Inc., Autoflight Instrument Div., 4522 Lankershim Blvd., North Hollywood, Calif.—G

Gisholt Machine Co., 1125 E. Washington Ave., Madison 3, Wis.—VM

Globe Industries, Inc., 125 Sunrise Pl., Dayton 7, Ohio—AM, WM

G-M Laboratories, Inc., 4300 N. Knox Ave., Chicago 41, Ill.—A, G, V

G. M. Mfg. Co., 50 W. Third St., New York 12, N. Y.—T

Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—FM, FS, ST, OM

Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—FM, S

Grenby Mfg. Co., Plainville, Conn.—B, D, FM, O, VT, WA, QE

Gruen Watch Co., Time Hill, Cincinnati, Ohio—M

Gurley, W. & L. E., 514 Fulton St., Troy, New York—TA

Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y.—FM

Hanovia Chemical & Mfg. Equipment, 233 N. J. R. R. Ave., Newark 5, N. J.—L

Hart Moisture Gauges, Inc., 126 Liberty St., New York 6, N. Y.—MO, O

Hartford Machine Screw Co., 476 Capitol Ave., Hartford 2, Conn.—MP

Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—G, WM

Hasler-Tel Co., 34 Vesey St., New York 7, N. Y.—TA

Hathaway Instrument Co., 1315 S. Clarkson St., Denver, Col.—EG, EM, G, PM, TM, TF, VM

Haydon Mfg. Co., Inc., Forestville, Conn.—TM

Haydu Bros., P. O. Box 1226, Plainfield, N. J.—N, VG

Heiland Research Corp., 130 E. Fifth Ave., Denver 9, Colo.—G

Helipot Corp., 1015 Mission St., So. Pasadena, Calif.—PH

Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—B, D, FM, H, IC, IT, IG, PH, TM, VT

Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—PM

Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—D, FM, S, TA, TM, TR, VT, VM, WA, WM

Heyer Products, Inc., 471 Cortlandt St., Belleville 9, N. J.—BT

Hickok Electrical Instrument Co., 10514 Dupont, Cleveland 8, Ohio—A, FM, G, M, O, R, S, TA, TH, TT, VT, VI, V, W

Higgins Industries Inc., 2221 Warwick Ave., Santa Monica, Calif.—WM

Hoffman Engineering Corp., 458 Sexton Bldg., Minneapolis 4, Minn.—C, TM

Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—FM

Holtzer-Cabot, Div. First Industrial Corp., 125 Amory St., Roxbury 19, Mass.—IT, MO

Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich.—TH

Huber Radio Co., 260 S. Center St., Casper, Wyo.—VM

Ideal Industries, Inc., 5194 Park Ave., Sycamore, Ill.—IT, TA

Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill.—"Alnor"—TH, T

Industrial Instruments, Inc., 17 Pollock Ave., Jersey City 5, N. J.—B, H, IT, MO, MP, O, VT

Industrial Timer Corp., 115 Edison Pl., Newark 5, N. J.—TM

Industrial Transformer Corp., 2540 Belmont Ave., New York 58, N. Y.—IT

Instrument Electronics, 253-21 Northern Blvd., Little Neck, L. I., N. Y.—VT, V

Intex Co., 303 W. 42nd St., New York 18, N. Y.—M, N

Islip Radio Mfg. Corp., Islip, N. Y.—FM, IT

Jackson Electrical Instrument Co., 18 S. Patterson Blvd., Dayton, Ohio—B, C, M, TT

Jarrell-Ash Co., 165 Newbury St., Boston 16, Mass.—G

J-B-T Instruments, Inc., 441 Chapel St., New Haven 8, Conn.—A, FM, G, O, TH, T, TM, V

Jefferson, Ray, Inc., 40 E. Merrick Rd., Freeport, L. I., N. Y.—F, FM

Jennings Radio Mfg. Co., McLaughlin Rd., San Jose 12, Calif.—TH

Johnson, E. F., Co., Waseca, Minn.—PH

Jones Motrola Corp., 432 Fairfield Ave., Stamford, Conn.—TA

Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—BT, B, FM

Klett Mfg. Co., 179 E. 87th St., New York, N. Y.—C

Kluge Electronics Co., 1031 N. Alvarado St., Los Angeles 26, Calif.—FM

Knights, James, Co., Sandwich, Ill.—FM

Lampkin Laboratories, Bradenton, Fla.—FM

Lane-Wells Co., 5610 S. Soto St., Los Angeles 11, Calif.—VM

Lavoie Laboratories, Matawan-Freehold Rd., Morganville, N. J.—FM, WM

Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—FM, QE, VT, WM

Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia 44, Pa.—B, FM, FS, G, IT, L, O, PH, P, TH, TM

Leitz, E., Inc., 730 Fifth Ave., New York 19, N. Y.—C, PE, PH

Lektra Labs., Inc., 30 E. 10th St., New York 3, N. Y.—TM

Lenkurt Electric Co., 1138 Howard St., San Francisco 3, Calif.—TR

Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y.—IT, VG

Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn.—A, G, O, TH, T, V

Link, Fred M., 125 W. 17th St., New York 11, N. Y.—FM, M

Link Engineering Co., 13581 Elmira St., Detroit 27, Mich.—ST

Littelfuse, Inc., 4757 Ravenswood Ave., Chicago 40, Ill.—N, TH

Litton Engineering Laboratories, P. O. Box 749, Redwood City, Calif.—IG

Lumenite Electric Co., 407 S. Dearborn St., Chicago 5, Ill.—TM

Lyman Electronic Corp., 12 Cass St., Springfield, Mass.—H, N, O, TT, VT

McClintock, O. B., Co., 139 Lyndale Ave., N., Minneapolis 3, Minn.—A, G, MP, M, O, S, V

McColpin-Christie Corp., 4922 S. Figueroa St., Los Angeles 37, Calif.—BT

Madison Electrical Products Corp., 78 Main St., Madison, N. J.—"Mepco"—FM, IT, R, TH, TT, VT

Magnaflux Corp., 5900 Northwest Hghwy., Chicago 31, Ill.—F

Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—B, FM, MO, VT, W, WM, MM

Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—FM

Marion Electrical Instrument Co., Stark Street Gate, Manchester, N. H.—A, F, MP, L, MO, O, VI, V

Marshall Radio Engineering Laboratories, 5008 Lankershim Blvd., North Hollywood, Calif.—F, FM

Martindale Electric Co., Box 617, Edgewater Branch, Cleveland 7, Ohio—O

MB Mfg. Co., Inc., Instrument Div., 331 East St., East Haven 11, Conn.—A, AM, BT, G, MP, M, O, QE, S, VM, V

Measurements Corp., 116 Monroe St., Boonton, N. J.—AM, B, F, IT, MO, O, VT, VM, V, WM

Menard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—D, FM, H, TR

Meissner Mfg. Div., Maguire Industries, Inc., Mt. Carmel, Ill.—R

Mendelsohn Speedgun Co., 457 Bloomfield Ave., Bloomfield, N. J.—TM

Mepco—Madison Electrical Products Corp.

Meters, Inc., 915 Riveria Dr., Indianapolis 5, Ind.—A, G, S, V

Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.—EM, TA

Mico Instrument Co., 80 Trowbridge St., Cambridge 38, Mass.—HA, WM

Millco—M. A. Miller Mfg. Co.

Millen, James, Mfg. Co., Inc., 150 Exchange St., Malden 48, Mass.—FM, WM

Miller, M. A., Mfg. Co., 1169 E. 43rd St., Chicago 15, Ill.—"Millco"—MP

Miller, William Corp., 362 Colorado St., Pasadena 2, Calif.—G, VM

Monarch Mfg. Co., 2014 N. Major Ave., Chicago 39, Ill.—D, VI, OM

Monitor Piezo Products Co., 815 Fremont Ave., So. Pasadena, Calif.—FM, WM

Moulic Specialties Co., 1005-1007 W. Washington St., Bloomington, Ill.—VT

M & Z Industrial Development Co., 32 W. 12th St., Bayonne, N. J.—B, H, IT, MO, VT, V

National Instrument Co., 246 Walnut St., Newtonville 60, Mass.—TM

National Research Corp., Vacuum Engineering Div., 100 Brookline Ave., Boston 15, Mass.—VG

National Union Radio Corp., 57 State St., Newark 2, N. J.—VG

Niagara Electrical Instrument Co., 204-210 Franklin St., Buffalo 2, N. Y.—W

Nilsson Electrical Laboratory, Inc., 103 Lafayette St., New York 13, N. Y.—G, MP, MO, O

North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—FM

Northern Laboratories, Ltd., 3101 27th Ave., Long Island City 2, N. Y.—H

Norton Electrical Instrument Co., 85 Hilliard St., Manchester, Conn.—A, BT, B, O, V

Nurnberg Thermometer Co., Inc., 112 Broadway, Cambridge 42, Mass.—P

Offner Electronics, Inc., 5320 N. Kedzie Ave., Chicago 25, Ill.—VM

Pacific Electronics, Sprague at Jefferson St., Spokane, Wash.—F, FM

Panoramic Radio Corp., 242-250 W. 55th St., New York 19, N. Y.—F, FM, WA

Partlow Corp., 2 Campion Rd., New Hartford, N. Y.—T

Permo, Inc., 6415 Ravenswood Ave., Chicago 26, Ill.—MP

Pfaltz & Bauer, Inc., 350 Fifth Ave., New York, N. Y.—C, G

Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill.—MP

Philco Corp., Tioga & "C" Sts., Philadelphia 34, Pa.—M, O, R, VT, V

Photovolt Corp., 35 Madison Ave., New York 16, N. Y.—C, L, PE, RM

Pickering & Crowe Audio Laboratories, 475 Fifth Ave., New York 17, N. Y.—D

Polytron Corp., 401 Broadway, New York 13, N. Y.—FM, H, IG, S

Portable Products Corp., C. J. Tagliabue Div., 550 Park Ave., Brooklyn 5, N. Y.—G, PH, TH

Potter Instrument Co., 136-56 Roosevelt Ave., Flushing, L. I., N. Y.—FM, IC, TA, TM

Powers Electronic & Communication Co., New St., Glen Cove, N. Y.—S

Powers Regulator Co., 2720 Greenview Ave., Chicago, Ill.—T

Precision Apparatus Co., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y.—A, BT, MO, M, O, R, TT, VT, VI, V

Precision Products Co., 26 Bedford St., Waltham 54, Mass.—MP

Precision Scientific Co., 1750 N. Springfield Ave., Chicago 47, Ill.—T

Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—PH

Pyro—Pyrometer Instrument Co.

Pyrometer Instrument Co., 103 Lafayette St., New York, N. Y.—"Pyro"—T

Pyrotron—Bailey Meter Co.

Radio City Products Co., 127 W. 26th St., New York 1, N. Y.—B, M, O, R, TT, VT, V

Radio Craftsmen, 1341 S. Michigan Ave., Chicago 5, Ill.—TT

Radio Frequency Laboratories, Inc., Boonton, N. J.—IC, L, VT

Radio Specialty Mfg. Co., 403 N. W. 9th St., Portland 9, Ore.—FM

Radiotechnic Laboratory, 1328 Sherman Ave., Evanston, Ill.—TT

Rascher & Betzold, Inc., 730 N. Franklin St., Chicago 10, Ill.—F, PH

Rawson Electrical Instrument Co., 116 Potter St., Cambridge 42, Mass.—A, E, M, TH, TM, V, W

RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—D, F, FM, FS, R, S, TT, VG, VI

Readrite Meter Works, 136 E. College Ave., Bluffton, Ohio—A, V

Rectifier Engineering Co., 1809 E. 7th St., Los Angeles 21, Calif.—BT

Rehtron Corp., 4313 Lincoln Ave., Chicago 18, Ill.—B, F, M, S, VT, VM

Reiner Electronics Co., Inc., 152 W. 25th St., New York 1, N. Y.—FM, M, R, VT

Rek-O-Kut Co., 146 Grand St., New York 13, N. Y.—VI

Reliance Electric & Engineering Co., Ivanhoe Rd., Cleveland 10, Ohio—TA

Rice's, Bernard Sons, 325 Fifth Ave., New York 16, N. Y.—WM

Richards, Arklay S., Co., Inc., 78 Winchester St., Newton Highlands 61, Mass.—TH

Rieber, Frank, Inc., 11916 W. Pico Blvd., Los Angeles 34, Calif.—FM, TM, TF, VT, WM

Riggs & Jeffreys, Inc., 73 Winthrop St., Newark 4, N. J.—AM

Riverbank Laboratories, Geneva, Ill.—TF

Robinson-Houchin Optical Co., 79 Thurman Ave., Columbus 6, Ohio—FM, FS, PM, S

Robson-Burgess Co., 5002 N. 30th St., Omaha 11, Nebr.—M, TT

Roller-Smith Div., Realty & Industrial Corp., 1760 W. Market St., Bethlehem, Pa.—A, N, T, V, W

Rowe Radio Research Laboratory Co., 2422 N. Pulaski Rd., Chicago 39, Ill.—E, IC, MO, O, PM, ST, TA, TM, VT, VM

Rubicon Co., Ridge Ave. at 35th St., Philadelphia 32, Pa.—B, C, G

Sanborn Co., 39 Osborne St., Cambridge 39, Mass.—G

Sangamo Electric Co., 11th & Converse Sts., Springfield, Ill.—A, TA, WH

Saxl Instrument Co., 38-40 James St., East Providence 14, R. I.—EG, EM, VC
Schuttig & Co., 9th & Kearny Sts., N. E., Washington 17, D. C.—FM, WM
Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—O, VT, V
Scientific Service Laboratories, 915 Meridian Ave., S. Pasadena, Calif.—SG, VT, L, G, A, PH
Scovill Mfg. Co., 99 Mill St., Waterbury 91, Conn.—MP
Senn Corp., New Augusta, Ind.—EG, EM
Sensitive Research Instrument Co., 9-11 Elm Ave., Mt. Vernon, N. Y.—G, TH, V, W
Shallcross Mfg. Co., Jackson & Pusey Aves., Collingdale, Pa.—G, MO
Sherron Electronics Co., 1201 Flushing Ave., Brooklyn 6, N. Y.—H, IT, PH, R, ST, B, D, HA, QU
Shure Bros., 225 W. Huron St., Chicago 10, Ill.—VM
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—B, FM, M, O, VT
Simmonds Aerocessories, Inc., 30 Rockefeller Plaza, New York 20, N. Y.—MM
Simpson Electric Co., 5216 W. Kinzie St., Chicago, Ill.—A, G, M, V, O, R, TT
Solar Capacitor Sales Corp., 285 Madison Ave., New York 17, N. Y.—B
Sorensen & Co., 375 Fairfield Ave., Stamford, Conn.—FM, PH
S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N. Y.—S
Sound Apparatus Co., 233 Broadway, New York 7, N. Y.—FS, S, VT
Special Electric Labs., 7657 S. Central Ave., Los Angeles 1, Calif.—FM
Special Products Co., 9215 Brookville Rd., Silver Spring, Md.—SG
Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y.—F
Sprague Products Co., North Adams, Mass.—B
Standard Electric Time Co., 89 Logan St., Springfield 2, Mass.—IC, TA, TM
Standard Instruments Corp., 568 Prospect Ave., New York 55, N. Y.—B
Standard Piezo Co., 127 Cedar St., Carlisle, Pa.—FM
Steel, Herman D., Co., Lafayette Bldg., Philadelphia 6, Pa.—MP
Sterling Mfg. Co., 9205 Detroit Ave., Cleveland 2, Ohio—A, V, BT
Stewart-Warner Alemite Corp., 1826 Diversey Pkwy., Chicago 14, Ill.—A, TA
Sticht, Herman H., Co., Inc., 27 Park Pl., New York 7, N. Y.—A, AF, B, E, IT, MO, O, TA, V, WH, W
Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—F
Stoelting, C. H., Co., 424 N. Homan Ave., Chicago 24, Ill.—VG, TF
Stokes, F. J., Machine Co., 6054 Tabor Rd., Philadelphia 20, Pa.—VG
Stokes, Jos., Rubber Co., Taylor & Webster Sts., Trenton 4, N. J.—TF
Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.—TH
Sun Mfg. Co., 6323 Avondale Ave., Chicago 31, Ill.—A, G, MO, O, S, TA, TH, VG, V
Sundt Engineering Co., 4763 Ravenswood Ave., Chicago, Ill.—TH
Superior Instruments Co., 227 Fulton St., New York 7, N. Y.—A, O, VT, V
Supreme Instruments Corp., Greenwood, Miss.—A, BT, M, MO, O, R, SG, TT, V, VT
Swiss Jewel Co., Lafayette Bldg., Philadelphia 6, Pa.—MP
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—A, EM, FM, IG, PE, PM, TH, TT, VG, VT
Takk Corp., 28 W. Market St., Newark, Ohio—IT, MO
Taller & Cooper, 75 Front St., Brooklyn 1, N. Y.—D, IC, TM
Taylor Tubes, Inc., 2312 Wabansia Ave., Chicago 47, Ill.—IG, VG
Tech Laboratories, 337 Central Ave., Jersey City 7, N. J.—AM, B, DC, EH, VC, MO
Technical Apparatus Co., 1171 Tremont St., Boston 20, Mass.—H, IT, MO, TT, VT
Technical Devices Corp., Beaufort & Eagle Rock Ave., Roseland, N. J.—VT
Techno-Scientific Co., 901 Nepperhan Ave., Yonkers 3, N. Y.—EH
Teleoptic Co., 1251 Mound Ave., Racine, Wis.—MP
Teleregister Corp., 157 Chambers St., New York 7, N. Y.—TM
Televiso Products, Inc., 6533 Olmstead Ave., Chicago, Ill.—B, FM, WA, VM, VT
Telicon Corp., 851 Madison Ave., New York 21, N. Y.—FM
Thermionic Engineering Corp., 32 W. 12th St., Bayonne, N. J.—B, H, IG
Thompson, John E. Co., 1440 W. 47th St., Chicago 9, Ill.—E, M, O, VT
Thwing-Albert Instrument Co., Penn St., & Pulaski Ave., Philadelphia 44, Pa.—AF, B, G, MP, O, PH, TH, T
Tong-Test—Columbia Electric Mfg. Co.
Transmitter Equipment Mfg. Co., Inc., 345 Hudson St., New York 14, N. Y.—F, FM, H, S, VI, WM
Trimount Instrument Co., 37 W. Van Buren, Chicago 5, Ill.—PM, TM, VM
Triplett Electrical Instrument Co., Harmon Rd., Bluffton, Ohio—A, M, O, R, S, TH, TT, V, W
Triumph Mfg. Co., 913 W. Van Buren St., Chicago 7, Ill.—BT, M, O, R, TT
Universal Electronic Labs., Inc., 44 W. 18th St., New York, N. Y.—B
Universal X-Ray Products, Inc., 1300 N. Francisco Ave., Chicago 47, Ill.—TH, TM, TF, VG
U. S. Gauge Co., Sellersville, Pa.—A, BT, PM, T, VG, V
U. S. Television Mfg. Corp., 3 W. 61st St., New York 23, N. Y.—IT
Wadsworth Watch Case Co., Inc., Dayton, Ky.—MP
Walker, Robert, Inc., 403 W. 8th St., Los Angeles 14, Calif.—FM, FR, M, O, PM, TH
Wallace & Tiernan Products, Inc., Main & Mill Sts., Belleville 9, N. J.—PH
Warren Telechron Co., Ashland, Mass.—TM
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—MP
Waterman Products Co., Inc., 2445-63 Emerald St., Philadelphia 25, Pa.—B, D, VT, W, WA
Waugh Laboratories, 420 Lexington Ave., New York 17, N. Y.—EG
Weksler Thermometer Corp., 52 W. Houston St., New York, N. Y.—PM, T, VG
Welch, W. M. Mfg. Co., 1515 Sedgwick St., Chicago 10, Ill.—A, G, M, O, PH, S, TA, TF, VG, WH, W
Weltronic Co., 19500 W. Eight Mile Rd., Detroit 19, Mich.—IC, TA, TT
Western Electric Co., 195 Broadway, New York 7, N. Y.—S
Westinghouse Elec. Corp., Meter Div., 95 Orange St., Newark 1, N. J.—A, AF, E, M, O, P, R, TA, TH, TM, V, WH, W
Westinghouse Elec. Corp. East Pittsburgh, Pa.—A, AF, AM, BT, EG, EM, E, F, FM, FS, G, H, IC, MP, IT, IG, MO, M, O, PE, P, S, TA, TH, TM, VM, VI, V, WH, W
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—A, AM, BT, FM, G, IT, L, MO, M, O, P, R, S, TA, T, TT, VI, V, W
Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—FM, MP, WM
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.—A
White Research, 899 Boylston St., Boston Mass.—VT
Winslow Co., 9 Liberty St., Newark 5, N. J.—B, G, IG, MO, O, PH, TH, T, VG
Zernickow, O. Co., 15 Park Row, New York 7, N. Y.—TA

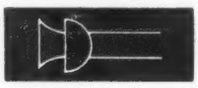
(21) Metal for Radio

Aluminum ..... A
Aluminum tubing ..... AT
Barium ..... BA
Bearings ..... BG
Beryllium ..... BR
Brass ..... B
Brass tubing ..... BT
Carbon & Graphite ..... CA
Copper tubing ..... CT
Core materials, laminated ..... CM
Core materials, powdered ..... CP
Die castings ..... DC
Flexible metal hose ..... H
Foils, tin, lead, etc. ..... FO
Iron (SVEA metal) I
Lead, tin alloys ..... LT
Magnesium alloys ..... MA
Metal bellows ..... MB
Metal coated steel ..... CS
Metal finishing service ..... MF
Molybdenum ..... M
Monel tubings ..... ML
Nickel ..... N
Nickel tubing ..... NT
Permanent magnets ..... PM
Platinum ..... P
Porous bearing metals ..... PB
Screw machine products ..... SP
Sheet metal ..... SH
Silver brazing alloys ..... SB
Silver & compounds ..... AG
Spring contact metals ..... SC
Stampings ..... S
Stainless steel ..... ST
Steel tubing ..... FT
Tantalum ..... TA
Thermostatic metals ..... TM
Tungsten ..... T
Wire screen cloth ..... WC
Zirconium ..... Z

Ace Mfg. Corp., Erie Ave. at "K" St., Philadelphia 24, Pa.—LG, S
Acklin Stamping Co., 1923 Nebraska Ave., Toledo 7, Ohio—S
Acme Tool & Die Co., 426 Ingle St., Evansville 8, Ind.—S
Adel Precision Products Corp., 10777 Van Owen St., Burbank, Calif.—S
Agalov Tubing Co., 75 West St., New York 6, N. Y.—FT
Aircraft-Marine Products, Inc., 1523 N. 4th St., Harrisburg, Pa.—S
Aircraft Screw Products Co., Inc., 47-23 35th St., Long Island City 1, N. Y.—SP
Allegheny Ludlum Steel Corp., Brackenridge, Pa.—CM, ST
Allmetal Screw Products Co., 33 Greene St., New York 13, N. Y.—SP
Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1, N. Y.—FO, LT
Aluminum Co. of America, Oliver Bldg., Pittsburgh, Pa.—A, AT, MA
Aluminum Finishing Corp., 1119 E. 22nd St., Indianapolis 2, Ind.—A, MF
Aluminum Goods Mfg. Co., 1512 Washington St., Manitowoc, Wis.—S
American Brass Co., 414 Meadow St., Waterbury 88, Conn.—B, BT, CT, DC, H, S
American Electro Metal Corp., 320 Yonkers Ave., Yonkers, N. Y.—M, T
American Materials Co., 150 Nassau St., New York 7, N. Y.—A, AT, BG, B, BT, CT, ST, FT
American Nut & Bolt Fastener Co., 2029 Doerr St., Pittsburgh 12, Pa.—S
American Platinum Works, N. J. R. R. Ave. at Oliver St., Newark 5, N. J.—SB, AG, P
American Radio Hardware Co, 152-4 MacQueston Pkwy. S., Mt. Vernon, N. Y.—SP, SC, S
American Rolling Mill Co., Curtis St., Middletown, Ohio—CM, CS, ST
Andrews & Perillo, 39-30 Crescent St., Long Island City, N. Y.—S
Apollo Metal Works, S. Oak Park Ave. at 66th Pl., Chicago 49, Ill.—CS
Arnold Engineering Co., 147 E. Ontario St., Chicago 11, Ill.—PM
Atlas Metal Stamping Co., 3801 Castor Ave., Philadelphia 24, Pa.—S
Auburn Heights Mfg. Co., 2481 Leach Rd., Pontiac, Mich.—SP
Austin, O., Co., 335 Throop Ave., Brooklyn, N. Y.—S
Bailey Co., Inc, 21 Water St., Amesbury, Mass.—S
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.—P, SB, AG, TM, WC
Barnes Co., Wallace, P. O. Box 1521, Bristol, Conn.—S
Bay State Stamping Co., 380 Chandler St., Worcester 1, Mass.—S
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—CM, PM
Belmont Smelting & Refining Works, 330 Belmont Ave., Brooklyn 7, N. Y.—A, BA, BR, B, DC, FO, LT, MA, M, N, SB, TA, T
R. H. Bird & Co. Inc., 23 Moody St., Waltham, Mass.—BG
Bossert Co., Inc., 1002 Oswego St., Utica 1, N. Y.—S, ST
Brainin, C. S. Co., 233 Spring St., New York 13, N. Y.—TM
Bridgeport Brass Co., Grand St., Bridgeport 2, Conn.—B, CT
Buchmann Spark-Wheel Corp., 4-20 47th Ave., Long Island City 1, N. Y.—SP
Bundy Tubing Co., 10951 Hern Ave., Detroit 13, Mich.—ML, NT, FT
Bunting Brass & Bronze Co., 715 Spencer St., Toledo 9, Ohio—BG
Bussey Pen Products Co., 5151 W. 65th St., Chicago 38, Ill.—S, WC
Callite Tungsten Corp., 540 39th St., Union City, N. J.—M, NT, SP, SB, AG, SC, TM, T
Carbone Corp., 400 Myrtle Ave., Boonton, N. J.—CA
Chace Co., Wm., 1630 Beard Ave., Detroit 9, Mich.—MA
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.—B, BT, CT, DC, SP, S, WC
Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.—CT, H, MB
Cinaudagraph Corp., 2 Selleck St., Stamford, Conn.—PM
Cleveland Tungsten, Inc., 10200 Meech Ave., Cleveland 5, Ohio.—T
Cleveland Wire Cloth & Mfg. Co., 3573 E. 78th St., Cleveland 5, Ohio—WC
Clifton Products, Inc., Blackbrook Rd., Painesville, Ohio—BR
Cohn, Sigmund & Co., 44 Gold St., New York 7, N. Y.—P
Congress Tool & Die Co., Congress Die Casting Div., 3750 E. Outer Dr., Detroit, Mich.—DC, S
Contract Specialties Co., 1743 Labrosse St., Detroit 16, Mich.—S
Corbin Screw Div., American Hardware Corp., High, Myrtle & Grove Sts., New Britain, Conn.—SP
Crescent Industries, Inc., 4140 Belmont Ave., Chicago 41, Ill.—S
Crowley, Henry L. & Co., Inc., 1 Central Ave., West Orange, N. J.—BG, CM, CP, PM, PB
Crucible Steel Co. of America, 405 Lexington Ave., New York 17, N. Y.—PM, ST
Cundy-Bettoney Co., Inc., Bradlee St., Hyde Park, Boston 36, Mass.—SP
Dahlstrom Metallic Door Co., Buffalo & E. Second, Jamestown, N. Y.—S
Dalmo Victor, Div. of Goldfield Consolidated Mines Co., 1414 El Camino Real, San Carlos, Calif.—MA
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—S
Dayton Rogers Mfg. Co., 2835 Twelfth Ave. S., Minneapolis 7, Minn.—S
Diebel Die & Mfg. Co., 3658 N. Lincoln Ave., Chicago 13, Ill.—S
Disston, Henry & Sons, Inc., Tacony, Philadelphia 35, Pa.—ST
Division Lead Co., 836 W. Kinzie St., Chicago 22, Ill.—DC, FO, LT, SB, AG
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—A, BG, B, DC, LT, MA, MF, S

Dollin Corp., 600 S. 21st St., Irvington 11, N. J.—DC
Dover Industries, Inc., 2022 N. Campbell Ave., Chicago, Ill.—CS, MF
Dow Chemical Co., Midland, Mich.—MA
Driver-Harris Co., Middlesex St., Harrison, N. J.—N
Easyflow—Handy & Harman
Edwards, T. J., Inc., 210 South St., Boston 5, Mass. —S
Electronic Supply Co., 207 Main St., Worcester 8, Mass.—S
Engineering Co., 27 Wright St., Newark, N. J.—SP, S
Ericsson Screw Machine Products Co., Inc., 25 Lafayette St., Brooklyn 1, N. Y.—SP
Fafnir Bearing Co., Booth St., New Britain, Conn.—BG
Fairmont Aluminum Co., Fairmont, W. Va.—A, AT
Fansteel Metallurgical Corp., 2200 Sheridan Rd., N. Chicago, Ill.—CP, M, SC, TA, T
Fischman Co., 10th St., & Allegheny Ave., Philadelphia 33, Pa.—B, S, ST
Follansbee Steel Corp., 3rd & Liberty Ave., Pittsburgh, Pa.—SH
Foote Mineral Co., 12 E. Chelten Ave., Philadelphia 44, Pa.—M, ST, T, Z
Gardiner Mfg. Co., 2711 Union St., Oakland 7, Calif. —S
Gardiner Metal Co., 4820 S. Campbell Ave., Chicago 32, Ill.—LT
General Aniline & Film Corp., Special Products Sales Dept., 270 Park Ave., New York 17, N. Y.—CP
General Magnetic Corp., 2126 E. Fort St., Detroit 7, Mich.—PM
General Plate Div., Metals & Controls Corp., Attleboro, Mass.—TM, CS, SC
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn 27, N. Y.—FO, LT, SB
Goat Metal Stampings, Inc., 314 Dean St., Brooklyn 17, N. Y.—S
Goldsmith Bros. Smelting & Refining Co., 58 E. Washington St., Chicago 2, Ill.—BG, P, SB, AG
Grammes, L. F. & Sons, Inc., 392 Union St., Allentown, Pa.—S
Graphalloy—Graphite Metallizing Corp.
Graphite Metallizing Corp., 1055 Nepperhan Ave., Yonkers, N. Y.—"Graphalloy"—CA
Great Metal Mfg. Corp., 5-13 Wyckoff Ave., Brooklyn 6, N. Y.—S
Greene, C. G., Mfg. Co., Warren, Pa.—S
Gregory Mfg. Co., 67 Franklin St., New Haven 11, Conn.—S
Greist Mfg. Co., 430 Blake St., New Haven 15, Conn. —SP, S
Gussack Machined Products Co., 10-20 45th Rd., Long Island City 1, N. Y.—SP, S
Hall, C. M. Lamp Co., 1035 E. Hancock Ave., Detroit 7, Mich.—DC, S
Handy & Harman, 82 Fulton St., New York 7, N. Y.—"Easyflow"—SB, AG
Hardware Specialties Mfg. Co., P. O. Box 844, Bridgeport 1, Conn.—SP, S
Hartford Machine Screw Co., 476 Capitol Ave., Hartford 2, Conn.—SP
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—SP, S
Haydu Bros., P. O. Box 1226, Plainfield, N. J.—M, N, S, T
Heyman Mfg. Co., Michigan Ave., Kenilworth, N. J.—S
High Tension Co., Inc., 36 N. Main St., Phillipsburg, N. J.—CT
Hommel Co., O., 209 Fourth Ave., Pittsburgh, Pa.—FO, SB, AG
Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich.—N
Hunter Pressed Steel Co., Lansdale, Pa.—S
Hydraulic Tool & Die Corp., 4625 Third Ave., New York 57, N. Y.—S
ICA—Insuline Corp. of America
Indiana Steel Products Co., 6 N. Michigan, Chicago 2, Ill.—PM
Industrial Screw & Supply Co., 717 W. Lake St., Chicago 6, Ill.—SP, S
Instrument Glass & Mirror Co., 383 Pearl St., Brooklyn 1, N. Y.—MF
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—"ICA"—A, CS, S
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.—ML, N, NT
Jelliff, C. O. Mfg. Corp., Pequot Rd., Southport, Conn.—WC
Johnston Tin Foil & Metal Co., 6100 S. Broadway, St. Louis 11, Mo.—FO
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—CM, S
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.—LT
Keystone Carbon Co. Inc., 1935 State St., St. Marys, Pa.—CA, PB
Keystone Electronics Co., 50-52 Franklin St., New York 13, N. Y.—SP
King Laboratories, Inc., 205 Oneida St., Syracuse 4, N. Y.—BA, MA, S, ST
Kling Metal Spinning Co., 174 Centre St., New York 13, N. Y.—S
Kollath Mfg. Co., 4601 W. Addison St., Chicago, Ill. —SP, S
Kolton Electric Mfg. Co., 123 New Jersey Railroad Ave., Newark 5, N. J.—S
Krischer Metal Products Co., 631-637 Kent Ave., Brooklyn 11, N. Y.—S
Landis & Gyr, Inc., 104 Fifth Ave., New York, N. Y.—BG
Lansing Stamping Co., 1159 S. Pennsylvania Ave., Lansing, Mich.—S
Linick, Leslie L., 29 E. Madison St., Chicago, Ill.—SB
Little Falls Alloys, Inc., 189 Caldwell Ave., Paterson 1, N. J.—BR, CT
Magna Mfg. Co., Inc., 444 Madison Ave., New York 22, N. Y.—A
Makepeace, D. E. Co., Pine & Dunham Sts., Attleboro, Mass.—CM, P, SB, AG, SC
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.—M, SC, T
Matthews & Co., Jas. H., 3729 Belmont Ave., Chicago 18, Ill.—DC, S
Mendelsohn Speedgun Co., 457 Bloomfield Ave., Bloomfield, N. J.—BT
Mepham, Geo. S. Corp., 2001 Lynch Ave., E. St. Louis, Ill.—"Mepham"—CP
Metal Textile Corp., 4 Central Ave., West Orange, N. J.—WC
Meyers Safety Switch Co., Inc., 423 Tehama St., San Francisco 3, Calif.—S
Micro-Ferrocart Div., Maguire Industries, Inc., Fairfield Ave., Stamford, Conn.—CP, PB, SP, ST
Mid-West Screw Products Co., 3662 Park Ave., St. Louis 10, Mo.—SP
Miniature Precision Bearings, Carpenter St., Keene, N. H.—BG
National Carbon Co., Inc., 30 E. 42nd St., New York 18, N. Y.—CA
National Die Casting Co., 600 N. Albany Ave., Chicago 12, Ill.—DC
National Moldite Co., 25 Montgomery St., Hillsdale 5, N. J.—CM, CP
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, Ohio—SP
Ney, J. M. Co., 71 Elm St., Hartford 1, Conn.—P
Noblitt Sparks Industries, Inc., Columbus, Ind.—S
North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—M, T
Northern Mfg. Co., Inc., 36 Spring St., Newark 2, N. J.—T
Oiljak Mfg. Co., Inc., Montclair, N. J.—S, MF
OK Machine Co., 2131 Fairfield Ave., Ft. Wayne 6, Ind.—SP, S
Olympic Tool & Mfg. Co., Inc., 39 Chambers St., New York 7, N. Y—S
Orange Screen Co., 615 Valley St., Maplewood, N. J. —S
Oscap Mfg Co., Inc., 207 W. Saratoga St., Baltimore 1, Md.—P, AG
Paraloy Co., 600 S. Michigan Ave., Chicago 5, Ill.—P, SB, AG
Patent Button Co., 41 Brown St., Waterbury 88, Conn.—MF
Patton-MacGuyer Co., 17 Virginia Ave., Providence 5, R. I.—S
Paul & Beekman, Div. of Portable Products Corp., 1801 Courtland St., Philadelphia 40, Pa.—S
Peck Spring Co., 20 Grove St., Plainville, Conn.—SP
Penn Fibre & Specialty Co., 2024 to 2030 E. Westmoreland St., Philadelphia 34, Pa.—S
Phelps Dodge Copper Products Corp., 40 Wall St., New York 5, N. Y.—BT, CT, NT
Philadelphia Rust Proof Co., 3227 Frankford Ave., Philadelphia 34, Pa.—MF
Pilot Industries, Inc., 202 E. 44th St., New York 17, N. Y.—SP
Plastic Metals, Inc., 155 Bridge St., Johnstown, Pa. —CP, I, PB
Plume & Atwood Mfg. Co., 470 Bank St., Waterbury 88, Conn.—B, S
Pollak Mfg. Co., Arlington, N. J.—S
Porter Metal Products, 121 Ingraham St., Brooklyn 6, N. Y.—S
Precimet Laboratories, 64 Fulton St., New York 7, N. Y.—MF
Precision Tube Co., 3828 Terrace St., Philadelphia 28, Pa.—AT, BT, CT, NT
Pyroferric Co., 175 Varick St., New York 14, N. Y.—CP
Quality Hardware & Machine Corp., 5849 N. Ravenswood Ave., Chicago 26, Ill.—S
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.—S
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—CS, MF, M, N, P, T
Red Arrow Electric Corp., 100 Colt St., Irvington 11, N. J.—S
Republic Steel Corp., Republic Bldg., Cleveland 1, Ohio—CM, CS, FT
Revere Copper & Brass, Inc., 230 Park Ave., New York 32, N. Y.—A, AT, B, BT, CT, MA, SB, S, FT
Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.—A, AT, FO
Riverside Metal Co., Riverside, N. J.—BR, SC, TM
Rusnreen Mfg. Co., 14262 Birwood Ave., Detroit 4, Mich.—S
Rustless Iron & Steel Corp., 3408 E. Chase St., Baltimore 13, Md.—ST
Santay Corp., 351 N. Crawford Ave., Chicago 24, Ill.—S
Scovill Mfg. Co., 99 Mill St., Waterbury 91, Conn.—B, BT, CT, SP, S
Screenmakers, Inc., 64 Fulton St., New York 7, N. Y.—MF
Sexton Can Co., Inc., 31 Cross St., Everett 49, Mass.—S
Speer Carbon Co., St. Marys, Pa.—CA
Speer Resistor Corp., Theresia St., St. Marys, Pa.—CP
Spencer Wire Co., 68 Pleasant St., W. Brookfield, Mass.—BR, ST
Sperman Metal Specialties, 2199 E. 21st St., Brooklyn 29, N. Y.—S
Stackpole Carbon Co., P. O. Box 327, St. Marys, Pa.—CA
Stamford Metal Specialty Co., 428 Broadway, New York 13, N. Y.—S
Standard Engineering Laboratories, 40 S. Oak Knoll Ave., Pasadena 1, Calif.—S
Steel Mill Div., Simmonds Saw & Steel Co., Lockport, N. Y.—PM
Stewart-Warner Alemite Corp., 1826 Diversey Pkwy., Chicago 14, Ill.—DC, SP, S
Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.—CA
Superior Tube Co., Norristown, Pa.—AT, CT, I, ML, NT, ST, FT
Summerill Tubing Co., Bridgeport, Pa.—CS, ML, N, NT, FT
Swedish Iron & Steel Corp., 17 Battery Pl., New York, N. Y.—I, PM
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—T
Tage Steel & Wire Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.—ST
Taylor Wharton Iron & Steel Co., High Bridge, N. J.—PM
Thermador Electric Mfg. Co., 5119 S. Riverside Dr., Los Angeles 22, Calif.—S
Thomas & Skinner Steel Products Co., 1120 E. 23rd St., Indianapolis 5, Ind.—CM, PM, S
Titan Metal Mfg. Co., Bellefonte, Pa.—DC, SP
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.—MF
Tubing Seal-Cap, Inc., 2810 E. 11th St., Los Angeles 23, Calif.—SP
Tubular Rivet & Stud Co., Wollaston 70, Mass.—SP
Uniform Tubes, Shurs Lane & Lauriston St., Philadelphia 28, Pa.—AT, BT, CT, NT, FT
United Radio Mfg. Co., 191 Greenwich St., New York, N. Y.—A
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—CT
Van Huffel Tube Corp., Warren, Ohio—FT
Veeder-Root, Inc., Hartford, Conn.—DC
Wadsworth Watch Case Co., Inc., Dayton, Ky.—S, SP
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—S
Webster-Chicago Corp., 5610 Bloomingdale Ave., Chicago 39, Ill.—S
Weirton Steel Co., Electrical Dept., Main St., Weirton, W. Va.—FO
Warner, R. D. Co., Inc., 295 Fifth Ave., New York 16, N. Y.—A, AT
Western Brass Mills, East Alton, Ill.—B, S
Westinghouse Elec. Corp., East Pittsburgh, Pa.—BG, CM, LT, M, SB, TM, T
Whitehead Stamping Co., 1661 W. Lafayette Blvd., Detroit 16, Mich.—S
Wickwire Spencer Metallurgical Corp., 260 Sherman Ave., Newark 5, N. J.—M, ST, T, WC
Wildberg Bros. Smelting & Refining Co., 742 Market St., San Francisco 2, Calif.—P, SB, AG
Willor Mfg. Corp., 794 E. 140th St., New York 54, N. Y.—CS, S
Wilson, H. A. Co., 105 Chestnut St., Newark 5, N. J. —P, AG, TM, T
Winslow Co., 9 Liberty St., Newark 5, N. J.—AG
Worcester Pressed Steel Co., Worcester, Mass.—S
Wrought Washer Mfg. Co., 2100 South Bay St., Milwaukee 7, Wis.—S
Wynn Mfg. Div., Hudson Supply Co., 401 N. 27th St., Richmond 23, Va.—SP
Youngstown Pressed Steel Co., Warren, Ohio—S

(22) Microphones



Carbon ..... **CAR**
Condenser ..... **CON**
Connectors ..... **CTR**
Contact ..... **CT**
Crystal ..... **CRY**
Dynamic ..... **DYN**
Hearing aid microphones ..... **HA**
Springs ..... **SPR**
Stands ..... **STD**
Stethophones ..... **S**
Telephone handsets ..... **T**
Velocity ..... **VEL**

American Earphone Co., 10 E. 43rd St., New York 17, N. Y.—CAR
American Microphone Co., Inc., 1917 S. Western Ave., Los Angeles, Calif.—CAR, CON, CTR, CRY, DYN, SPR, STD, VEL
Amperite Co., 561 Broadway, New York, N. Y.—CTR, CT, DYN, STD, VEL
Art Specialty Co., 3245 W. Lake St., Chicago, Ill.—STD
Astatic Corp., Cor. Harbor & Jackson Sts., Conneaut, Ohio—CT, CRY, DYN, STD

Atlas Sound Corp., 1443 39th St., Brooklyn 18, N. Y.—STD

Auth Electric Specialty Co., Inc., 422-430 E. 53rd St., New York 22, N. Y.—T

Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—CAR, T

Aviometer Corp., 370 W. 35th St., New York 1, N. Y. —CAR, CON, CTR, CT, DYN, S, T

Barker & Williamson, Upper Darby, Pa.—CON

Barnes Co., Wallace, P. O. Box 1521, Bristol, Conn. —SPR

Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—CRY

Bendix Radio Division, Bendix Aviation Corp., East Joppa Rd., Baltimore 4, Md.—CAR, DYN, T

Berger Electronics, 109-01 72nd Rd., Forest Hills, N. Y.—CON, DYN

Bogen, David Co., Inc., 663 Broadway, New York 12, N. Y.—STD

Boom Electric & Amplifier Co., Inc., 1227 W. Washington Blvd., Chicago 7, Ill.—DYN

Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—CRY, HA, STD

Cambridge Instrument Co., Inc., 3005 Grand Central Terminal, New York 17, N. Y.—S

Connecticut Telephone & Electric, Div. Great American Industries, Inc., Meriden, Conn.—CAR, T

Dazor Mfg. Co., 4483 Duncan Ave., St. Louis 10, Mo.—STD

Eastern Mike-Stand Co., 56 Christopher Ave., Brooklyn 12, N. Y.—STD

Electronic Plumbing Corp., 311 Nepperhan Ave., Yonkers 2, N. Y.—CTR

Electro-Voice, Inc., P.O. Box 897, South Bend 24, Ind.—CAR, CON, CTR, CT, CRY, DYN, SPR, STD, S, T, VEL

Erwood Co., 223 W. Erie St., Chicago 10, Ill.—CRY, DYN, STD

Executone, Inc., 415 Lexington Ave., New York 17, N. Y.—DYN, STD

Faraday Electric Corp., Adrian, Mich.—T

Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—CAR, T

General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—CAR, SPR

Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—CAR, CON, DYN, STD, T, VEL

Hunter Pressed Steel Co., Lansdale, Pa.—SPR

Kaar Engineering Co., 619 Emerson St., Palo Alto, Calif.—CAR

Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—CAR, CON, CTR, CT, SPR, STD, T

Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 321 W. 50th St., New York 19, N. Y.—CTR

Lektra Labs., Inc., 30 E. 10th St., New York 3, N. Y.—DYN

Magnavox Co., Ft. Wayne 4, Ind.—CAR

Manross, F. N. & Sons, Div. Associated Spring Corp., Bristol, Conn.—SPR

Meletron Corp., 950 N. Highland Ave., Los Angeles 38, Calif.—STD

Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—CAR, CON, CT, DYN, STD, T

Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—T

North Electric Mfg. Co., Box 417, Galion, Ohio—T

Olympic Tool & Mfg. Co., Inc., 39 Chambers St., New York 7, N. Y.—STD

Operadio Mfg. Co., St. Charles, Ill.—DYN

Permoflux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—DYN, T

Powers Electronic & Communication Co., New St., Glen Cove, N. Y.—DYN

Racon Electric Co., Inc., 52 E. 19th St., New York 3, N. Y.—DYN, STD

Rauland Corp., 4245 N. Knox Ave., Chicago 41, Ill.—CRY, DYN, VEL

RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—CAR, CTR, CRY, DYN, STD, VEL

Reeves Sound Laboratories, Div. Reeves-Ely Laboratories, Inc., 62 W. 47th St., New York, N. Y.—STD

Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—DYN, T

Robinson-Houchin Optical Co., 79 Thurman Ave., Columbus 6, Ohio—S

Shure Bros., 225 W. Huron St., Chicago 10, Ill.—"Unidyne"—"Uniplex"—CAR, CTR, CRY, DYN, HA, STD, S

Simpson, Mark Mfg. Co., 188 W. 4th St., New York 14, N. Y.—STD

Sonata Products Co., 624 S. Michigan Ave., Chicago 5, Ill.—CAR

Sonotone Corp., Saw Mill River Rd., Elmsford, N. Y. —CT, CRY

Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—STD

Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—CAR, CTR, CRY, DYN, STD, T, VEL

Telephonics Corp., 350 W. 31st St., New York 1, N. Y. —CAR, T

Trimm, Inc., 1770 W. Berteau Ave., Chicago 13, Ill.—STD

Turner Co., 909 17th St., N.E., Cedar Rapids, Iowa—CT, CRY, DYN, HA, STD, T

Unidyne—Shure Bros.

Uniplex—Shure Bros.

Universal Microphone Co., 424 Warren Lane, Inglewood, Calif.—CAR, DYN, STD, T, VEL

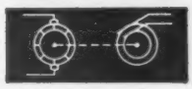
University Laboratories, 225 Varick St., New York 14, N. Y.—CAR, DYN

Waltham Screw Co., 77 Rumford Ave., Waltham, Mass.—CTR

Western Electric Co., 195 Broadway, New York 7, N. Y.—DYN

Western Sound & Electric Laboratories, Inc., 3512 W. St. Paul Ave., Milwaukee, Wis.—STD

(23) Motors & Generators



Alternators	**A**
Converters	**CON**
DC generators	**DC**
Dynamotors	**DYN**
Flexible couplings	**F**
Gas engines	**ENG**
Hand cranked generators	**HC**
HF generator	**HF**
Miniature control motors	**MM**
Motor starters	**MS**
Motors	**M**
Power plants	**AC**
Selsyns, etc.	**S**
Turntable motors	**T**

Aerovox Corp., New Bedford, Mass.—MS

Air-Way Electric Appliance Corp., 2101 Auburn Ave., Toledo 1, Ohio—A, CON, DC, DYN, MM, M

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.—HF

Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis.—MS

Alliance Mfg. Co., Alliance, Ohio—MM, T

Allis-Chalmers Mfg. Co., P. O. Box 512, Milwaukee 1, Wis.—A, CON, DC, MS, M

Allis Co., Louis, 427 E. Stewart St., Milwaukee 7, Wis.—A, CON, DC, M

Amglo Corp., 4224 Lincoln Ave., Chicago 18, Ill.—MM, M, T

Arnessen Electric Co., Inc., 116 Broad St., New York 4, N. Y.—DC, HC, HF, M, S

Atlas Aircraft Products Corp., 5-17 46 Road, Long Island City 1, N. Y.—A, DC, HC, M, AC

Barber-Colman Co., River & Loomis Sts., Rockford, Ill.—MM

Bendix Aviation Corp., Bendix Radio Div., East Joppa Rd., Baltimore 4, Md.—DYN, MM, S

Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, N. Hollywood, Calif.—DC, DYN, HC, MM, M

Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.—MM, M

Bogue Electric Co., 27 Kentucky Ave., Paterson 8, N. J.—A, CON, DC, DYN, HF, M, AC

Boonton Radio Corp., 518 Main St., Boonton, N. J. —CON

Boston Gear Works, Inc., 14 Hayward St., N. Quincy 71, Mass.—F

Browne Electric Co., J., 3774 Surf Ave., Brooklyn 24, N. Y.—MS

Brown-Brockmeyer Co., 1000 S. Smithville Rd., Dayton 1, Ohio—DC, DYN, M

Brujac Electronic Corp., 11 Park Pl., New York 7, N. Y.—HF

Buda Co., Harvey, Ill.—ENG, AC

Burke Electric Co., 12th & Cranberry, Erie, Pa.—A, CON, DC, DYN, HC, M

Carson Machine & Supply Co., 202 S.E. 29th St., Oklahoma City 9, Okla.—A, CON, ENG, AC

Carter Motor Co., 1608 Milwaukee Ave., Chicago 47, Ill.—A, CON, DC, DYN, HC, M

Caterpillar Tractor Co,, Peoria 8, Ill.—AC

Century Electric Co., 1806 Pine St., St. Louis 3, Mo.—DC, M

Chicago Sound Systems, Inc., 2124 S. Michigan Ave., Chicago, Ill.—CON

Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio—MS

Climax Engineering Co., Clinton, Iowa—A, DC, ENG

Cline Electric Mfg. Co., 4550 W. Lexington Ave., Chicago, Ill.—MS

Columbia Electric Mfg. Co., 4519 Hamilton Ave., N.E., Cleveland 14, Ohio—A, DC, M

Communication Measurements Laboratory, 120 Greenwich St., New York 6, N. Y.—HF

Connecticut Telephone & Electric, Div. of Great American Industries, Inc., Meriden, Conn.—HC

Continental Electric Co., Inc., 325 Ferry St., Newark 5, N. J.—A, CON, DC, DYN, M, AC, T

Crystal Research Laboratories, Inc., 29 Allyn St., Hartford 3, Conn.—AC

Cutler-Hammer Inc., 315 N. 12th St., Milwaukee 1, Wis.—MS

Daimo Victor, Div. Goldfield Consolidated Mines Co., 1414 El Camino Real, San Carlos, Calif.—MM, M

Dayton Acme Co., 930 York St., Cincinnati 14, Ohio —HC

Delco Appliance Div., General Motors Corp., 391 Lyell Ave., Rochester 1, N. Y.—ENG, MM, M, AC

DeWalt Products Corp., Fountain Ave., Lancaster, Pa.—M

Diehl Mfg. Co., Finderne Plant, Somerville, N. J.—A, CON, DC, DYN, MM, M, S

Dumore Co., 1225 14th St., Racine, Wis.—M

Dynamic Air Engineering, Inc., 1619 S. Alameda St., Los Angeles 21, Calif.—M

Eastern Air Devices, Inc., 585 Dean St., Brooklyn 17, N. Y.—MM, M

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.—A, CON, DC, DYN, ENG, M, MM

Eicor, Inc., 1501 W. Congress St., Chicago 7, Ill.—A, CON, DC, DYN, HC, HF, MM, M, AC

Electric Indicator Co., 23 Parker Ave., Stamford, Conn. —A, DC, HC, MM, M, S

Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, Ohio—A, CON, DC, M, AC

Electric Specialty Co., 214 South St., Stamford, Conn. —"Esco"—A, DC, M, S

Electron Equipment Corp., 917 Meridian Ave., So. Pasadena, Calif.—MS

Electronic Laboratories, Inc., 122 W. New York St., Indianapolis 4, Ind.—CON

Electronic Measurements Co., Red Bank, N. J.—HF

Emerson Electric Mfg. Co., 1824 Washington Ave., St. Louis 3, Mo.—M

Esco—Electric Specialty Co.

Fairbanks, Morse & Co., 606 S. Michigan Ave., Chicago, Ill.—M

Fairchild Camera & Instrument Corp., 8806 Van Wyck Blvd., Jamaica 1, N. Y.—DC, MM, T

Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—DYN, HF, MS

Fractional Motors Co., 1501 N. Halsted St., Chicago 22, Ill.—DC, MS, M

Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—DC, ENG, HC, MS, T

Gaston Power Tools, 2659 W. 95th St., Chicago 42, Ill. —A, DC, ENG, HF, M, AC

General Aviation Equipment Co., Inc., 2 East End Ave., New York 21, N. Y.—A

General Industries Co., Taylor & Olive Sts., Elyria, Ohio—M, T

General Tire & Rubber Co., Garfield, Wabash, Ind.—F

Globe Industries, Inc., 125 Sunrise Place, Dayton 7, Ohio—MM, M

Great Lakes Electric Mfg. Co., 17 S. Desplaines St., Chicago 6, Ill.—A, CON, DC, HF

Hannon Electric Co., 1605 Waynesburg Rd., S.E., Canton, Ohio—F, MS

Hansen Mfg. Co., R.R. No. 1, Princeton 14, Ind.—MM, M

Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.—DC, M

Hartman Corp. of America, 6417 Manchester, St. Louis 10, Mo.—AC

Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—DC, MM

Haydon Mfg. Co., Inc., Forestville, Conn.—MM

Hertner Electric Co., 12690 Elmwood Ave., Cleveland 11, Ohio—A, CON, DC, M

Hobart Mfg. Co., Troy, Ohio—S

Holtzer-Cabot, Div. of First Industrial Corp., 125 Amory St., Roxbury 19, Mass.—A, DC, HC, MM, M

Homelite Corp., Riverdale Ave., Port Chester, N. Y.—DC, AC

Howell Electric Motors Co., Howell, Mich.—M

Imperial Electric Co., Ira & Edison Aves., Akron 9, Ohio—A, CON, DC, M

Jacobsen Mfg. Co., 747 Washington Ave., Racine, Wis. —A, DC, DYN, ENG, HF

Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill.—A, CON, DC, DYN

Kato Engineering Co., 530 N. Front St., Mankato, Minn.—A, CON, DC, HF, M, AC

Kegron Mfg. Co. Inc., 18 W. 20th St., New York 11, N. Y.—MM, S

Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—A, CON, DC, DYN, ENG, MS, M

Kohler Co., Kohler, Wis.—A, DC, ENG, AC

Kollsman Instrument Div. of Square D Co., 80-08 45th Ave., Elmhurst, N. Y.—A, MM, S

Kurz & Root Co., 214 Island St., Appleton, Wis. —A, DC

Leland Electric Co., 1501 Webster St., Dayton 4, Ohio—A, DC, HF, M, AC

Lorain Products Corp., 1122 F St., Lorain, Ohio—CON

Lord Mfg. Co., 1639 W. 12th St., Erie, Pa.—F

Magnetic Products Co., Norwalk, Conn.—M

Martin-Holmes, Inc., 249 Wayne Ave., Dayton, Ohio—T

Master Vibrator Co., 200 Davis Ave., Dayton 1, Ohio—A, ENG, AC

Metron—W. C. Robinette Co.

Micromotors—Redmond Co., A. G.

Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—F

Monitor Controller Co., 51 S. Gay St., Baltimore 2, Md.—MS

Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland 4, Ohio—A, DC, DYN, M

Onan & Sons, D. W., 3216 Royalston Ave., Minneapolis 3, Minn.—A, CON, DC, ENG, AC

Oster Mfg. Co., John, 1 Main St., Racine, Wis.—MM, M

Pacific Sound Equipment Co., 130 N. Beaudry Ave., Los Angeles 12, Calif.—T

Phelon Co., R. E., 199 Union St., Springfield, Mass.—A

Pilot Electric Co., 29 S. Broadway, Long Branch, N. J. —DYN, M

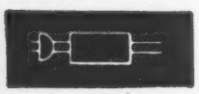
Pilot—F. A. Smith Mfg. Co.

Pioneer Electric Co., 3700 E. Olympic Blvd., Los Angeles 23, Calif.—AC

Pioneer Gen-E-Motor Corp., 5841-49 Dickens Ave., Chicago 39, Ill.—CON, DC, DYN, MM, AC

Radex Corp., 2066 Elston Ave., Chicago 14, Ill.—DYN, MM, M, T
Ready Power Co., 3826 Grand River Ave., Detroit, Mich.—AC
Redmond Co., A. G., Owosso, Mich.—"Micromotors"—DYN. M
Reliance Electric & Eng. Co., Ivanhoe Rd., Cleveland 10, Ohio—DC, M
Reynolds Electric Co., 2650 W. Congress St., Chicago 12, Ill.—M
Robinette Co., W. C., 802 Fair Oaks Ave., South Pasadena, Calif.—"Metron"—T
Rogers Diesel & Aircraft Corp., 1120 Leggett Ave., New York 59, N. Y.—A, DC, AC
Ruby Electric Co., 729 Seventh Ave., New York, N. Y.—CON, DC
Russell Electric Co., 340 W. Huron St., Chicago 10, Ill.—A, DYN, MM, M, T
Signal Electric Mfg. Co., 1939 Troam St., Menominee, Mich.—M
Simonds Machine Co., Inc., 246-48 Worcester St., Southbridge, Mass.—MS
Small Motors, Inc., 1322 Elston Ave., Chicago 22, Ill.—DYN, HC, MM, M, T
Smith Mfg. Co., F. A., Union & Augusta, Rochester 2, N. Y.—"Pilot"—M
Speedway Mfg. Co., 1834 S. 52nd Ave., Cicero 50, Ill.—MM, M, T
Star Electric Motor Co., 200 Bloomfield Ave., Bloomfield, N. J.—A, CON, DC, DYN, M
Sturtevant Co., B. F., Damon, Hyde Park, Boston 36, Mass.—DC, M, AC
Superior Electric Co., 1901 Indiana Ave., Chicago 16, Ill.—DC, HC
Terminal Products Co., 1 Main St., Racine, Wis.—DC, DYN, MM, M, T
Times Telephoto Equipment, Inc., 229 W. 43rd St., New York 18, N. Y.—MM
U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles, Calif.—M
U. S. Television Mfg. Corp., 3 W. 61st St., New York 23, N. Y.—A
Universal Electric Co., 300 E. Main St., Owosso, Mich.—MM, M
Universal Motor Company, 186 Harrison St., Oshkosh, Wis.—ENG, AC
Wagner Electric Corp., 6410 Plymouth Ave., St. Louis, Mo.—M
Walker, Inc., Robert, 403 W. 8th St., Los Angeles 14, Calif.—F, MS
Walker-Turner Co., Inc., 639 South Ave., Plainfield, N. J.—M
Warren Telechron Co., Ashland, Mass.—MM
Waters Conley Co., Rochester, Minn.—T
Webster-Chicago Corp., 5610 Bloomingdale Ave., Chicago 39, Ill.—T
Westinghouse Elec. Corp., East Pittsburgh, Pa.—A, CON, DC, DYN, HC, HF, MM, MS, M, AC, S
Wincharger Corp., E. 7th at Division, Sioux City 6, Iowa—A, CON, DC, DYN, M, T

(24) Noise Elimination Equipment



Interference analyzers ..... **IA**
Interference locators ..... **I**
Power filters ..... **P**
Radio set filters ..... **S**

Aarons Radio Corp., 125 E. 46th St., New York 17, N. Y.—I
Aeronautical Radio Mfg. Co., 155 First St., Mineola, L. I., N. Y.—P, S
Aerovox Corp., 740 Belleville Ave., New Bedford, Mass.—IA, I, P, S
Ameco—American Electronics
American Communications Corp., 306 Broadway, New York, N. Y.—P, S
American Electronics, 37 E. 18th St., New York 3, N. Y.—"Ameco"—IA, I, P, S
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—P, S
American Transformer Co., Inc., 178 Emmet St., Newark 5, N. J.—S
Avia Products Co., 7266 Beverly Blvd., Los Angeles, Calif.—P, S
Barker & Williamson, Upper Darby, Pa.—I, P
Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, North Hollywood, Calif.—S
Communication Parts, 1101 N. Paulina St., Chicago 22, Ill.—S
Cornell-Dubilier Electric Corp., S. Plainfield, N. J.—"Quietone"—IA, I, PS
Deutschmann Corp., Tobe, Canton, Mass.—IA, I, P, S
Drake Co., R. L., 11 Longworth St., Dayton 2, Ohio—P, S
D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—P, S
Fast & Co., John E., 3129 N. Crawford Ave., Chicago 41, Ill.—S
Freed Transformer Co., 72 Spring St., New York 12, N. Y.—P
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—P, S
General Winding Co., 420 W. 45th St., New York 19, N. Y.—S
Jefferson, Inc., Ray, 40 E. Merrick Rd., Freeport, L. I., N. Y.—P
Mallory & Co., Inc., P. R., 3029 E. Washington St., Indianapolis 6, Ind.—S
Measurements Corp., 116 Monroe St., Boonton, N. J.—IA
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—P, S
Miller Co., J. W., 5917 S. Main St., Los Angeles 3, Calif.—"Miller"—P, S
Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—P
Philco Corp., Tioga & C Sts., Philadelphia, Pa.—P, S
Point Mfg. Co., 5775 N. Ridge Ave., Chicago 26, Ill.—S
Quietone—Cornell-Dubilier Elec. Corp.
Radio Laboratories, Inc., 2701 California Ave., Seattle 6, Wash.—P, S
Solar Capacitor Sales Corp., 285 Madison Ave., New York 17, N. Y.—P, S
Sprague Electric Co., 189 Beaver St., North Adams, Mass.—IA, I, P, S
Sprague Products Co., North Adams, Mass.—IA, I, P, S
Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—I
S-W Inductor Co., 1056 N. Wood St., Chicago 22, Ill.—S
Technical Appliance Corp., 46-06 DeLong St., Flushing, N. Y.—P, S
United Transformer Co., 150 Varick St., New York 13, N. Y.—P
Westinghouse Elec. Corp., East Pittsburgh, Pa.—P

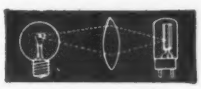
(25) Paint, Cement & Insulating Compounds

Adhesives ..... **A**
Cement ..... **C**
Coil Dopes ..... **CD**
Enamels ..... **E**
Insulating compounds ..... **I**
Lacquers ..... **L**
Marking inks ..... **M**
Misc. chemicals ..... **MC**
Paint ..... **P**
Resins ..... **R**
Solvents ..... **S**
Special lubricants ..... **SL**
Vacuum greases ..... **VG**
Varnish ..... **V**
Waterproofing Compounds ..... **WC**
Wax ..... **W**
Wrinkle finish ..... **WF**

Acheson Colloids Corp., Port Huron, Mich.—SL
Acme Wire Co., New Haven 14, Conn.—A, I, V
Acromark Co., 9-13 Morrell St., Elizabeth 4, N. J.—M
Advance Research Corp., 214 W. 42nd St., New York, N. Y.—I, SL
Allied Asphalt & Mineral Corp., 217 Broadway, New York 7, N. Y.—I
Ambroid Co., Inc., 305 Franklin St., Boston 10, Mass.—A, C, S, WC
American Products Mfg. Co., Oleander & Dublin Sts., New Orleans 18, La.—A, C, CD, I, L, R, S, WC, W
Arco Co., 7301 Bessemer Ave., Cleveland 4, Ohio—A, C, CD, E, I, L, M, P, R, S, V, WC, WF
Ault & Wiborg, Div. of Interchemical Corp., 350 Fifth Ave., New York 1, N. Y.—E, L, M, P, R, V, WC, WF
Austin Co., O., 335 Throop Ave., Brooklyn 21, N. Y.—M
Bakelite Corp., 30 E. 42nd St., New York 17, N. Y.—"Bakelite," "Fenox," "Vinylite," "Vinylseal," "Zyrox,"—A, C, I, R, V, WC, W
Baker Chemical Co., J. T., N. Broad St., Phillipsburg, N. J.—MC
Biwax Corp., 3445 Howard St., Skokie, Ill.—I, WC, W
Black Bear Co., Inc., 620 Fifth Ave., New York 20, N. Y.—SL
Cantol Wax Co., 211 N. Washington St., Bloomington, Ind.—I, WC, W
Cardinell Corp., 15 Label St., Montclair, N. J.—A
Catalin Corp., 1 Park Ave., New York 16, N. Y.—R
Clear Print—Phillips Process Co., Inc.
Clifton Products Inc, Blackbrook Rd., Painesville, Ohio—I
Crolite—Crowley & Co., Inc., Henry L.
Crowley & Co., Inc., Henry L., 1 Central Ave., West Orange, N. J.—"Crol.te"—A, C
Day & Co., James B., 1872 Clybourn Ave., Chicago 14, Ill.—A, C, CD, E, I, L, P, WC, W
Devoe & Raynolds Co., Inc., P. O. Box 328, Louisville 1, Ky.—E, L, P, R, V, W, WF
Distillation Products Inc., 755 Ridge Rd. W., Rochester 13, N. Y.—SL, VG
Dolph Co., John C., 1060 Broad St., Newark 2, N. J—A, C, E, I, L, S, V, WC, W
Dow Chemical Co., Midland, Mich.—S, MC
Dow Corning Corp., Midland, Mich.—I, P, R, SL, VG, V, WC
Durez Plastics & Chemicals Inc., 1926 Walck Rd., N. Tonawanda, N. Y.—A, R, V
Durite Plastics, 5000 Summerdale Ave., Philadelphia 24, Pa.—R
Egyptian Lacquer Mfg. Co., 1270 Sixth Ave., New York 20, N. Y.—E, L, S
Fansteel Metallurgical Corp., 2200 N. Sheridan Rd., N. Chicago, Ill.—MC
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—I
Fenox—Bakelite Corp.
Foote Mineral Co., 12 E. Chelten Ave., Philadelphia 44, Pa.—MC
Foster Co., Benjamin, 1411 Walnut St., Philadelphia 2, Pa.—A, C, E, I, M, P, WC
Gates, Geo W. Co., Inc., Hempstead Tpke. & Lucille Ave., Franklin Square, N. Y.—"Quartz-Etch"—MC
GC—General Cement Mfg. Co.
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—A, C, CD, E, I, L, M, P, R, S, SL, V, WC, W, WF
General Electric Co.— Specialty Div., 1001 Wolf St., Syracuse, N. Y.—C
Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y.—CD, I, R, SL, WC, W
Goldmark Wire Co., James, 116 West St., New York 7, N. Y.—C
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.—C
Halowax Products Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.—W
Hansen Co., Wm., 165 Silverbrook Ave., Niles, Mich.—A, C, R, S, SL, WC, W, WF
Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio—S
Harvel—Irvington Varnish & Insulator Co.
Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y.—E, L, P, V, WF
Horn Co., A. C., 43-36 Tenth St., Long Island City 1, N. Y.—E, L, P, V, WC, W, WF
Howe & French Inc., 99 Broad St., Boston 10, Mass.—A, C, CD, L, S, WC, WF
Insl-X Co., Inc., 857 Meeker Ave., Brooklyn 22, N. Y.—CD, I, L, R, V, WC
Insulation Mfrs. Corp., 565 W. Washington Blvd., Chicago 6, Ill.—C, CD, I, R, V
Interlake Chemical Corp.—Plastics Div., 1401 S. Circle Ave., Forest Park, Ill.—A, R
Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.—"Harvel," "Irvington"—A, C, E, I, L, P, R, V, WC
Joliet Chemicals Ltd., Industry Ave., Joliet, Ill.—WC
Keese Engineering Co., 7354-6-8 Santa Monica Blvd., Hollywood 46, Calif.—L, P
King Laboratories, Inc., 205 Oneida St., Syracuse 4, N. Y.—MC
Lacquer & Chemical Corp., 214 40th St., Brooklyn 32, N. Y.—C, CD, E, L, S, WC, WF
Libbey-Owens-Ford Glass Co.—Plaskon Div., 2112 Sylvan Ave., Toledo 6, Ohio—A, R
Linick, Leslie L., 29 E. Madison St., Chicago, Ill.—C, W
Lowe Bros. Co., 424 E. Third St., Dayton F2, Ohio—E, L, P, V, WF
Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N. J.—A, C, CD, E, I, L, M, P, R, S, V, WC, W, WF
Marblette Corp., 37-21 30th St., Long Island City 1, N. Y.—A, C, I, L, R, V
Markem Machine Co., Emerald St., Keene, N. H.—M
Merck & Co., Inc., Rahway, N. J.—MC
Mica Insulator Co., 200 Varick St., New York 14, N. Y. I, R, S, V
Midland Paint & Varnish Co., 9115 Reno Ave., Cleveland 5, Ohio—E, L, P, V, WF
Mitchell Rand Insulation Co., 51 Murray St., New York 7, N. Y.—I, P, W
Murphy Finishes Corp., 224 McWhorter St., Newark 1, N. J.—E, L, P, V, WF
National Co., Inc., 61 Sherman St., Malden 48, Mass.—CD
National Molding Co., 2141 W. Washington Blvd., Los Angeles 7, Calif.—A, C, CD, I, R, WC
N. E. Radiocrafters, 1156 Commonwealth Ave., Boston 34, Mass.—A, C, CD, L
New Wrinkle Inc., 1770 Springfield St., Dayton 3, Ohio—E, L, P, R, V, WF
Oakite Products Inc., 22 Thames St., New York 6, N. Y.—S
Pacific Clay Products, SteaPACtite Div., 306 W. Ave. 26, Los Angeles 31, Calif.—C
Paisley Products, Inc., 1770 Canalport Ave., Chicago 16, Ill.—A, C, R, WC
Patterson Screen Div., E. I. DuPont de Nemours & Co., Main St., Towanda, Pa.—MC
Pennsylvania Coal Products Co., Petrolia, Pa.—A, R
Phillips Process Co., Inc., 192 Mill St., Rochester 4, N. Y.—"Clear Print"—M

Pioneer Asphalt Co., 435 N. Michigan Ave., Chicago, Ill.—I, WC
Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.—SL
Plicote, Inc., 225 Galveston Ave., Pittsburgh 22, Pa. P, V
Pratt & Lambert Inc., 75 Tonawanda St., Buffalo 7, N. Y.—A, E, I, L, P, S, V, WF
Protectoseal Co., 1948 S. Western Ave., Chicago 8, Ill.—S
Quartz Etch—Geo. W. Gates Co., Inc.
Reichhold Chemicals Inc., 601 Woodward Heights Blvd., Detroit 20, Mich.—R
Reilly Tar & Chemical Corp., 1617 Merchants Bank Bldg., Indianapolis 4, Ind.—E, L, P, R, S, WC
Roxalin Flexible Finishes Inc., 800 Magnolia Ave., Elizabeth F, N. J.—A, CD, I, L, P, R, S, V, WC, WF
Sauereisen Cements Co., Sharpsburg Sta., Pittsburgh 15, Pa.—C, I
Schaar & Co., 754 W. Lexington St., Chicago, Ill.—MC
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"Walsco"—A, C, CD, E, I, L, P, S, SL, VG, V, WF
Sherwin-Williams Co., 101 Prospect Ave., Cleveland, Ohio—E, I, L, P, R, S, V
Special Chemicals Co., 1545 E. 18th St., Cleveland 14, Ohio—A, R
Special Chemicals Co., 30 Irving Place, New York 3, N. Y.—P
Sprague Electric Co., 189 Beaver St., North Adams, Mass.—I
Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago, Ill.—W
Standard Varnish Works, 2600 Richmond Terrace, Staten Island 3, N. Y.—E, I, L, P, V, WC, W, WF
Stevenson Bro. & Co., 110 Race St., Philadelphia 6, Pa.—R, SL, WC, W
Stewart-Warner Alemite Corp., 1826 Diversey Pkwy., Chicago 14, Ill.—SL
Technic Inc., 39 Snow St., Providence 3, R. I.—WC
Transicoil Corp., 114 Worth St., New York 13, N. Y.—WC
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—C, L
Vinylite—Bakelite Corp.
Vinyseal—Bakelite Corp.
Walsco—Walter L. Schott Co.
Welch Mfg. Co., W. M., 1515 Sedgwick St., Chicago 10, Ill.—VG
Western Reserve Laboratories, 1440 W. 3rd St., Cleveland 13, Ohio—S
Westinghouse Electric Corp., East Pittsburgh, Pa.—E, I, L, R, SL, V, WC
Wynn Mfg. Div., Hudson Supply Co., 401 N. 27th St., Richmond 23, Va.—C, CD, S, W
Zons, F. W., 239 Centre St., New York, N. Y.—MC
Zophar Mills Inc., 112-130 26th St., Brooklyn 32, N. Y.—A, C, I, WC, W
Zyrox—Bakelite Corp.

(26) Photoelectric Equipment



Complete units ..... **EE**
Light supplies ..... **L**
Photo cells ..... **PC**
Photometers ..... **PM**
Relays ..... **R**

Aarons Radio Corp., 125 E. 46th St., New York 17, N. Y.—PC
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—EE
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—EE
Advance Electric & Relay Co., 1260 W. Second St., Los Angeles 26, Calif.—R
Allied Control Co., Inc., 2 East End Ave., New York 21, N. Y.—R
AMECO—American Electronics Co.
American Electronics Co., 37 E. 18th St., New York 3, N. Y.—"AMECO"—EE
American Instrument Co., 8030 Georgia Ave., Silver Spring, Md.—R
American Television Laboratories, Inc., 433 E. Erie St., Chicago 11, Ill.—PC
Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—L
Associated Research & Eng. Laboratories, 38 Brady St., San Francisco 3, Calif.—EE, L
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—EE, R
Auth Electrical Specialty Co., Inc., 422 E. 53rd St., New York 22, N. Y.—R
Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—R
Barker & Williamson, Upper Darby, Pa.—EE
Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—PM
Bradley Laboratories, Inc., 82 Meadow St., New Haven 10, Conn.—"Luxtron"—PC
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—R
Burton Mfg. Co., 3855 N. Lincoln Ave., Chicago 13, Ill.—L
Carlton Lamp Corp., 730 S. 13th St., Newark 3, N. J.—L
Cetron—Continental Electrical Co.
Clare & Co., C. P., 4719 Sunnyside Ave., Chicago 30, Ill.—R
Clark Radio Equipment Corp., 4313 N. Lincoln Ave., Chicago 18, Ill.— EE
Cline Electric Mfg. Co., 4550 W. Lexington Ave., Chicago, Ill.—EE
Coleman Electric Co., 318 Madison St., Maywood, Ill.—PM
Continental Electric Co., 715 Hamilton St., Geneva, Ill.—"Cetron"—PC
DeJur Amsco Corp., Northern Blvd. at 45th St., Long Island City 1, N. Y.—PC
Detect-O-Ray Co., 3836 Hull St., Skokie, Ill.—EE
Dietert Co., Harry W., 9330 Roselawn Ave., Detroit 4, Mich.—PM
Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—EE
Eby, Inc., Hugh H., 18 W. Chelten Ave., Philadelphia 44, Pa.—PC, R
Electric Eye Equipment Co., 6 W. Fairchild St., Danville, Ill.—R
Electro-Eye—Hansen Co., Wm.
Electronic Control Corp., 1573 E. Forest Ave., Detroit, Mich.—EE, R
Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—EE
Electronic Laboratory, 306 S. Edinburgh Ave., Los Angeles, Calif.—R
Electronic Products Co., 19 N. First St., Geneva, Ill.—R
Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—EE
Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—EE, R
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—R
Ess Instrument Co., 96 S. Washington Ave., Bergenfield, N. J.—EE, R
Federal Instrument Co., 3917 47th Ave., Long Island City, N. Y.—R
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—PC, R
Fischer-Smith, Inc., 162 State St., West Englewood, N. J.—EE
Fisher Pierce Co., 74 Ceylon St., Boston 21, Mass.—EE, L, R
Gates & Co., Inc., Geo. W., Hempstead Tpke. & Lucille Ave., Franklin Sq., L. I., N. Y.—L
Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—EE
General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—EE
General Control Co., 1200 Soldiers Field Rd., Boston 34, Mass.—EE
General Electric Co., Lamp Dept., Nela Park, Cleveland 12, Ohio—L
General Electric Co., 1 River Rd., Schenectady 5, N. Y.—PC, R
General Scientific Corp., 4029 S. Kedzie Ave., Chicago, Ill.—"Lumotron"—PC
G-M Laboratories, Inc., 4300 N. Knox Ave., Chicago 41, Ill.—EE, PC, R
Goodall Electric Mfg. Co., 320 N. Spruce St., Ogallala, Neb.—R
Hanovia Chemical & Mfg. Equipment, 233 N.J.R.R. Ave., Newark 5, N. J.—EE, PM
Hansen Co., Wm., 165 Silverbook Ave., Niles, Mich.—"Electro-Eye", "Ordercall", "Radiocall"—EE
Haydon Mfg. Co., Inc., Forestville, Conn.—R
Herbach & Rademan Co., Mfg. Div., 517 Ludlow St., Philadelphia 6, Pa.—EE
Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio—PM
Hoffman Engineering Corp., 458 Sexton Bldg., Minneapolis 4, Minn.—EE
Industrial Electronics Corp., 80 Bank St., Newark, N. J.—R
Keeney & Co., Inc., J. H., 6610 S. Ashland Ave., Chicago 36, Ill.—EE
Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—EE
Leach Relay Co., 5915 Avalon Blvd., Los Angeles, Calif.—R
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia 44, Pa.—PM
Leitz, Inc., E., 730 Fifth Ave., New York 19, N. Y.—PM
Lewyt Corp., 60 Broadway, Brooklyn 11, N. Y.—R
Long Co., L. J., 186 Grand St., New York 13, N. Y.—EE
Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—EE, L, R
Lumotron—General Scientific Corp.
Luxtron—Bradley Labs., Inc.

OMISSIONS

Listings have been omitted in all cases when, after three requests, a company has failed to return our directory questionnaire or otherwise verify its activity.

MB Mfg. Co., Inc., Instrument Division, "E" St., New Haven, Conn.—EE
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—EE, R
Mellaphone Corp., 1462 E. Main St., Rochester 2, N. Y.—EE
Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—EE, R
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—R
National Union Radio Corp., 57 State St., Newark 2, N. J.—PC
North Electric Mfg. Co., Box 417, Galion, Ohio—R
Ordercall—Hansen Co., Wm.
Pacific Electronics, W. 1011-1013 First Ave., Spokane 5, Wash.—EE
Parker Engineering Products Co., 16 W. 22nd St., New York 10, N. Y.—R
Perkin-Elmer Corp., 535 Hope St., Glenbrook, Conn.—PM
Pfaltz & Bauer, Inc., 350 Fifth Ave., New York, N. Y.—EE, PC
Photoswitch, Inc., 77 Broadway, Cambridge, Mass.—EE, L
Photovolt Corp., 35 Madison Ave., New York 16, N. Y. PC, PM
Photronic—Weston Electrical Instrument Corp.
Point Mfg. Co., 5775 N. Ridge Ave., Chicago 26, Ill.—PM
Potter & Brumfield Mfg. Co., Inc., 617 N. Gibson St., Princeton, Ind.—R
Precision Scientific Co., 1750 N. Springfield Ave., Chicago 47, Ill.—L
Price Electric Corp., E. Church & Second Sts., Frederick, Md.—R
Radiant Lamp Corp., 300 Jelliff Ave., Newark, N. J.—L
Radiocall—Hansen Co., Wm.
Radio Frequency Laboratories, Inc., Boonton, N. J.—PM
Rauland Corp., 4245 N. Knox Ave., Chicago 41, Ill.—PC
Rehtron Corp., 4313 Lincoln Ave., Chicago 18, Ill.—EE, R
Rubicon Co., Ridge Ave. at 35th St., Philadelphia 32, Pa.—PM
Safety Electric Co., 110 S. Dearborn St., Chicago 3, Ill.—L
Selenium Corp. of America, 1719 W. Pico Blvd., Los Angeles 15, Calif.—PC
S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N. Y.—L, PC
Staco—Standard Electric Co.
Standard Electric Co., 400 Linden Ave., Dayton 3, Ohio—"Staco"—R
Struthers-Dunn, Inc., 1321 Arch St., Philadelphia 7, Pa.—R
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—L, PC
Task Electronics Co., 245 W. 54th St., New York, N. Y.—EE
Technical Products Co., 158 Madison Ave., Memphis, Tenn.—R
Times Telephoto Equipment, Inc., 229 W. 43rd St., New York 18, N. Y.—EE, PC
Tung-Sol Lamp Works, Inc., 95 Eighth Ave., Newark 4, N. J.—R
United Cinephone Corp., 65 New Litchfield St., Torrington, Conn.—EE, L, PC, R
Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio—PM
Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y.—R
Westinghouse Elec. Corp., East Pittsburgh, Pa.—EE, L, PC, R
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—"Photronic"—PC, R
White Research, 899 Boylston St., Boston 15, Mass.—EE, R
Worner Electronic Devices, 609 W. Lake St., Chicago 6, Ill.—EE, L, PC, R
Zetka Laboratories, Inc., 198-10-12 32nd Ave., Bayside, N. Y.—L

(27) Plastic Materials

Acrylics ..... **A**
Aniline-formaldehyde resin ..... **AF**
Cast resin ..... **CR**
Cellulose acetate ..... **C**
Celulose acetate butyrate ..... **CB**
Cellulose nitrate ..... **CN**
Ethyl cellulose ..... **EC**
Laminates ..... **L**
Melamines ..... **M**
Phenols ..... **PH**
Polyethylene ..... **PE**
Polystyrene ..... **P**
Silicone compounds ..... **S**
Urea ..... **U**
Vinyl resins ..... **V**

Acadia Synthetic Products Div., Western Felt Works, 4035 Ofiden Ave., Chicago, Ill.—P
Alvar—Shawinigan Prod. Corp.
American Cyanamid Co., Plastics Division, 30 Rockefeller Plaza, New York 20, N. Y.—"Beetle"—M, U

American Molding Powder & Chemical Corp., 44 "U" St., Brooklyn, N. Y.—C
American Phenolic Corp., 1830 S. 54th St., Cicero, Ill.—"Amphenol"—PH, P
American Products Mfg. Co., Oleander & Dublin Sts., New Orleans 18, La.—C, CN, EC
Amphenol—American Phenolic Corp.
Arco Co., 7301 Bessemer Ave., Cleveland 4, Ohio—A, AF, CR, CN, EC, L, M, PH, P, U
Baer Co., N. S., 9-11 Montgomery St., Hillside, N. J. L, PH
Bakelite Corp., 30 E. 42nd St., New York 17, N. Y. —"Bakelite," "Vinylseal," "Vinylite," "Vinyon" —CR, PH, P, U, V
Baker Oil Tools, Inc., 6000 S. Boyle St., Los Angeles 11, Calif.—CR
Beetle—American Cyanamid Co.
Bend-A-Lite Plastics Division, 423 South Honore St., Chicago 12, Ill.—A, CR, C, CB, PH, P, V
Butacite—E. I. DuPont de Nemours & Co., Inc.
Butvar—Shawinigan Prod. Corp.
Catalin Corp., 1 Park Ave., New York 16, N. Y.— "Loalin"—CR, PH, P
Celanese Plastics Corp., 180 Madison Ave., New York 16, N. Y.—"Celluloid", "Lumarith"—C, CN, EC
Celeron—Continental Diamond Fibre Co.
Cellanite—Continental Diamond Fibre Co.
Celluoid—Celanese Plastics Corp.
Chemaco Corp., Berkley Heights, N. J.—C, EC, P, V
Coffite—Formica Insulation Co.
Colonial Kolonite Co., 2214 Armitage Ave., Chicago 47, Ill.—A, CR, C, L, PH, P
Condenser Products Co., 1375 N. Branch St., Chicago 22, Ill —S
Continental-Diamond Fibre Co., Newark 50, Del.— "Celeron", "Cellanite", "Dilectene", "Dilecto", "Vulcoid"—AF, L, M, PH
Cournand & Co., E. L., 3835 Ninth Ave., New York 34, N. Y.—A, C, CN, P
Creative Plastics Corp., 963 Kent Ave., Brooklyn 5. N. Y.—A, CR, L, PH
Dilectene—Continental-Diamond Fibre Co.
Dilecto—Continental-Diamond Fibre Co.
Dow Chemical Co., Midland, Mich.—"Ethocel", "Styron"—EC, P, V
Dow Corning Corp., Midland, Mich.—S
DuPont de Nemours Co., Inc., E. I., Plastics Dept., 626 Schuyler Ave., Arlington, N. J.—"Butacite", "Lucite", "Plastacele", "Pyralin"—A, CR, C, CN
Durez Plastics & Chemicals, Inc., 1926 Walck Rd., North Tonawanda, N. Y.—"Durez"—PH
Durite Plastics, 5000 Summerdale Ave., Philadelphia 24, Pa.—PH
Electrical Insulation Co., Inc., 12 Vestry St., New York 13, N. Y.—PH
Ethocel—Dow Chemical Co.
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.—C, CB, EC, P, V
Felsenthal & Sons, G., 4108 W. Grand, Chicago 51, Ill —L
Fibestos—Monsanto Chemical Co.
Formica Insulation Co., 4614 Spring Grove Ave., Cincinnati 32, Ohio—"Coffite" "Formica"—L, M, PH, U
Formvar—Shawinigan Prod. Corp.
Franklin Mfg. Corp., A. W., 175 Varick St., New York 14, N. Y.—L, PH
Franklin Fibre-Lamitex Corp., Wilmington, Del.— "Lamitex"—L, PH
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—C, EC, P
General Electric Co., 1 River Rd., Schenectady 5, N. Y. —S
General Electronic Chemical Dept., Plastics Div., 1 Plastics Ave., Pittsfield, Mass.—"Textolite"—L
General Laminated Products, Inc., 2857 S. Halsted St., Chicago 8, Ill.—L, PH
Gering Products, Inc., Kenilworth, N. J.—A, C, CB, CN, EC, P, V
Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y.—U
Goodrich Chemical Co., B. F., Rose Bldg., Cleveland 15, Ohio—"Koroseal"—CR, V
Hercules Powder Co., 900 Market St., Wilmington 99, Del.—"Herculoid"—C, EC, CN
Herculoid—Hercules Powder Co.
Heresite & Chemical Co., Manitowoc, Wis.—"Heresite" —CR, PH
Howard Mfg. Corp., 1401 S. Main St., Council Bluffs, Iowa—M, PH, U
Indur—Reilly Tar & Chemical Corp.
Industrial Synthetics Corp., 60 Woolsey St., Irvington 11, N. J.—C, CB, EC, V
Insulating Fabricators of New England, Inc., 69 Grove St., Watertown, Mass.—L, M, PH
Insulating Tube Co., Inc., 26 Cottage St., P. O. Box 1, Poughkeepsie, N. Y.—L
Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 6, Ill.—L
Insulation Products Co., 504 North Richland St., Pittsburgh 8, Pa.—PH
Insurok—Richardson Co.
Interlake Chemical Corp., Plastics Div., 1401 S. Circle Ave., Forest Park, Ill.—CR, L, PH
Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.—PH
Keystone Electronics Co., 50-52 Franklin St., New York 13, N. Y.—L
Knoedler Chemical Co., 651 High St., Lancaster, Pa. —CR
Koroseal—Goodrich Co., B. F.
Lamicoid—Mica Insulator Co.
Lamitex—Franklin Fibre-Lamitex Corp.
Loalin—Catalin Corp.
Lucite—DuPont de Nemours Co., Inc., E. I.
Lumarith—Celanese Plastics Corp.
Lustron—Monsanto Chemical Co.
Libbey-Owens-Ford Glass Co., Plaskon Div., 2112 Sylvan Ave., Toledo 6, Ohio—M, U
Manufacturers Chemical Corp., Snyder Ave., Berkeley Heights, N. J.—C, EC, P, V
Marblette Corp., 37-21 Thirtieth St., Long Island City 1, N. Y.—"Marblette"—CR, PH
Mica Insulator Co., 200 Varick St., New York 14, N. Y.—"Lamicoid"—L, M, PH
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—L
Micarta Fabricators, Inc., 5324 Ravenswood Ave., Chicago 40, Ill.—L, PH
Micarta—Westinghouse Elec. Corp.
Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—C, EC
Millen Mfg. Co., Inc., 150 Exchange St., Malden 48, Mass.—P
Milprint, Inc., 431 West Florida St., Milwaukee 1, Wis.—L
Monsanto Chemical Co., Plastics Div., 600 Monsanto Ave., Springfield 2, Mass.—"Fibestos," "Lustron," "Opalon," Resinox"—C, CN, M, PH, P, V
National Vulcanzied Fibre Co., Maryland Ave., & Beech St., Wilmington 99, Del.—"Phenolite"—L
Nixon Nitration Works, Nixon, N. J.—"Nixonite"— C, CN, EC
Nixonite—Nixon Nitration Works
Norton Laboratories, Inc., 360 Mill St., Lockport, N. Y.—A, C, EC, PH, P, U, V
Ohmoid—Wilmington Fibre Specialty Co.
Opalon—Monsanto Chemical Co.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, Ohio—L
Panelyte—St. Regis Paper Co.
Parisian Novelty Co., 3510 South Western Ave., Chicago 9, Ill.—A, C, CN, L, M, PH, U
Penn Fibre & Specialty Co., 2024 to 2030 E. Westmoreland St., Philadelphia 34, Pa.—L
Pennsylvania Coal Products Co., Petrolia, Pa.—PH
Phenolite—National Vulcanized Fibre Co.
Plastacele—E. I. DuPont de Nemours & Co., Inc.
Plastic Fabricators Co., 440 Sansome St., San Francisco 11, Calif.—C, V
Plax Corporation, 133 Walnut St., Hartford 5, Conn. —C, CB, EC, P
Plexiglas—Rohm & Haas Co.
Precision Paper Tube Co., 2035 W. Charleston St., Chicago 47, Ill.—C, EC, P
Pyralin—E. I. DuPont de Nemours & Co., Inc.
Reichhold Chemicals, Inc., 601 Woodward Heights Blvd., Detroit 20, Mich.—PH
Reilley Tar & Chemical Corp., 1617 Merchants Bank Bldg., Indianapolis 4, Ind.—"Indur"—PH
Resinox—Monsanto Chemical Co.
Resistoflex Corp., 39 Plansoen St., Belleville, N. J.— V
Richardson Co., 27th & Lake Sts., Melrose Park, Ill.— "Insurok"—L
Rogers Corporation, Mill & Oakland Sts., Manchester, Conn.—PH
Rohm & Haas Co., Washington Square, Philadelphia 5, Pa —"Plexiglas"—A
St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.—"Panelyte"—L, M, PH, U
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—CN, EC, P, V
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—P
Shawinigan Products Corp., 350 Fifth Ave., New York, N. Y.—"Alvar," "Butvar," "Formvar"—V
Silicocks-Miller Co., 10 West Parker Ave., Maplewood, N. J.—L
Spaulding Fibre Co., 310 Wheeler St., Tonawanda, N. Y.—"Spauldite"—C
Spauldite—Spaulding Fibre Co.
Special Chemicals Co., 1545 E. 18th St., Cleveland 14, Ohio—PH, V
Standard Products Co., 505 Blvd. Bldg., Detroit 2, Mich.—A, AF, CR, C, CB, CN, EC, L, M, PH, P, U, V
Stokes Rubber Co., Joseph, Trenton, N. J.—C., P
Styron—Dow Chemical Co.
Synthane Corp., Oaks, Pa.—"Synthane"—L, M, PH
Taylor Fibre Co., Norristown, Pa.—L
Tenite—Tennessee Eastman Corp.
Tennessee Eastman Corp., Kingsport, Tenn.—"Tenite" —C
Textolite—General Electric Co., Plastics Div.
Tingstol Co., 1461 W. Grand Ave., Chicago 22, Ill.— —A, L
United Radio Mfg. Co., 191 Greenwich St., New York, N. Y.—PH
Varflex Corp., N. Jay St., Rome, N. Y.—V
Vinylite—Bakelite Corp.
Vinylseal—Bakelite Corp.
Vinyon—Bakelite Corp.
Vulcoid—Continental-Diamond Fibre Co.
Western Lithograph Co., 600 E. 2nd St., Los Angeles 54, Calif.—L
Westinghouse Elec. Corp., East Pittsburgh, Pa.— "Micarta"—L, M, PH, S, U
Wilmington Fibre Specialty Co., P. O. Drawer 1028, Wilmington 99, Del.—"Ohmoid"—L, PH

(28) Plastic Molders and Fabricators

Cabinet molders C
Extruded shapes ..... E
Fabricators ..... F
Parts molders ..... P

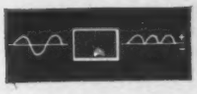
A.B.C. Products Inc., 2131 Stoner Ave., West Los Angeles 25, Calif.—F
Adrem Co., 143 Newbury St., Boston 16, Mass.—P
Airtronics Development Corp., 131-133 E. 3rd St., Dayton 2, Ohio—P
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—P
Allmetal Screw Products Co., 33 Greene St., New York 13, N. Y.—P
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.—P
American Insulator Corp., New Freedom, Pa.—C, P
Anchor Plastics Co., 541 Canal St., New York, N. Y. —E
Atlas Products Corp., 30 Rockefeller Plaza, New York 20, N. Y.— C, E, F, P
Auburn Button Works, Inc., Auburn, N. Y.—C, E, P
Baer Co., N. S., 9-11 Montgomery St., Hillside, N. J. —F
Bakelite Corp., 30 E. 42nd St., New York 17, N. Y.— "Bakelite"—P
Barker & Williamson, Upper Darby, Pa.—F
Bastian Bros. Co., 1600 N. Clinton Ave., Rochester, N. Y.—F
B & C Insulation Products Inc., 261 Fifth Ave., New York, N. Y
Bend-A-Lite Plastics Div., 423 S. Honore St., Chicago 12, Ill.—F
Boonton Molding Co., 326 Myrtle Ave., Boonton, N. J. —F, P
Brilhart Ltd., Arnold, 435 Middle Neck Rd., Great Neck, L. I., N. Y.—F, P
Burke Electric Co., 12th and Cranberry, Erie, Pa.—P
Burton Mfg. Co., 3855 N. Lincoln Ave., Chicago 13, Ill.—P
Carter Products Corp., 6921 Carnegie Ave., Cleveland 3, Ohio—E
Celluplastic Corp., 50 Ave., L., Newark, N. J.—E, F, P
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.—E
Chicago Die Mold Corp., 4001 Wrightwood Ave., Chicago 39, Ill.—C, P
Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago 51, Ill.—C, P
Cinch Mfg. Corp., Div. United-Carr Fastener Co., 2335 W. Van Buren St., Chicago, Ill.—E, F, P
Cleveland Plastics Inc., 1611 E. 21st St., Cleveland 14, Ohio—P
Colonial Kolonite Co., 2214 Armitage Ave., Chicago 47, Ill.—F
Consolidated Molded Products Corp., 309 Cherry St., Scranton 2, Pa.—C, P
Continental-Diamond Fibre Co., Newark 50, Del.— —F, P
Cournand & Co., E. L., 3835 Ninth Ave., New York 34, N. Y.—F
Creative Plastics Corp., 963 Kent Ave., Brooklyn 5, N. Y.—C, F
Crowley & Co., Inc., Henry L., 1 Central Ave., West Orange, N. J.—E, P
Davies Molding Co., Harry, 1428 N. Wells St., Chicago 10, Ill.—C, F, P
Davis Plastics Co., Joseph, Arlington, N. J.—EP
Dayton Insulating Molding Co., Dayton, Ohio—P
Diemolding Corp., Rasbach St., Canastota, N. Y.—P
Dillon Beck Mfg. Co., 103 Montgomery Ave., Irvington 11, N. J.—P
Eclipse Moulded Products Co., 5150 N. 32nd St., Milwaukee 9, Wis.—C, E, F, P
Edwards, Inc., T. J., 210 South St., Boston 5, Mass. —F
Electric Coding Machine Co., 57 Franklin St., New York 13, N. Y.—F
Electrical Insulation Co., Inc., 12 Vestry St., New York 13, N. Y.—F
Electronic Mfg. Co., 339-347 W. 8th Ave., Dubuque, Iowa—F
Electronic Processes Corp., 249 Richards Rd., Ridgewood, N. J.—F
Emeloid Co., Inc., Laurel Ave., Arlington, N. J.—F, P
Felsenthal, G., & Sons, 4108 W. Grand, Chicago 51, Ill.—F, P
Franklin, A. W., Mfg. Corp., 175 Varick St., New York 14, N. Y.—F, P
Franklin Fibre-Lamitex Corp., Wilmington, Del.—F
Gemloid Corp., 7910-7930 Albion Ave., Elmhurst, L. I., N. Y.—"Gemute"—E, F, P
Gemute—Gemloid Corp.
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—F
General Electronic Chemical Dept., Plastics Div., 1 Plastics Ave., Pittsfield, Mass.—E, P
General Industries Co., Taylor & Olive Sts., Elyria, Ohio—P

General Laminated Products, Inc., 2857 S. Halsted St., Chicago 8, Ill.—F
Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—E, P
Grayhill, 1 N. Pulaski Rd., Chicago 24, Ill.—P
Hawley Products Co., 333-839 N. 6th St., St. Charles, Ill.—C
Heath Co., 305 Territorial, Benton Harbor, Mich.—F
Hopp Press, Inc., 460 W. 34th St., New York 1, N. Y. —E, F, P
Howard Mfg. Corp, 1401 S. Main St., Council Bluffs, Iowa—C, P
Imperial Molded Products Corp., 2925 W. Harrison St., Chicago 12, Ill.—P
Industrial Fabricators, Inc., 1890 Carter Rd., Cleveland 13, Ohio—F
Industrial Molded Products Co., 2035 Charleston St., Chicago, Ill.—P
Industrial Synthetics Corp., 60 Woolsey St., Irvington 11, N. J.—"Synflex"—E
Insulating Tube Co., Inc., 26 Cottage St., P. O. Box 1, Poughkeepsie, N. Y.—E
Insulation Mfg. Co., 11 N. Y. Ave., Brooklyn 16, N. Y. —P
Insurok—Richardson Co.
International Products Corp., 2254 Greenmount Ave., Baltimore 18, Md.—F
Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.—E, F
Jorgensen Mfg. Co., 1547 W. Farms Rd., New York 60, N. Y.—F
Keasby & Mattison Co., Ambler, Pa.—P
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—P
Keystone Electronics Co., 50-52 Franklin St., New York 13, N. Y.—F
Kirk Molding Co., 142 Brook St., Clinton, Mass.—P
Klise Mfg. Co., 50 Cottage Grove St., S. W., Grand Rapids 2, Mich.—F
Kulka Electric Mfg. Co., Inc., 30 South St., Mt. Vernon, N. Y.—F, P
Kurz Kasch, Inc., Dayton 1, Ohio—C, P
Long Island Engraving Co., 19 W. 21st St., New York 10, N. Y.—F
Mack Molding Co., Wayne, N. J.—E, C, P
Maico Co., Inc., 21 N. Third St., Minneapolis 1, Minn.—C, E, F, P
Mastercraft Plastics Co., Inc., 95-01 150th St., Jamaica 4, N. Y.—F
Mayfair Molded Products Corp., 4440 N. Elston Ave., Chicago 30, Ill.—P
McInerney Plastics Co., 25 Commerce Ave., S. W., Grand Rapids 2, Mich.—FI
Metaplast Co., 205 W. 19th St., New York 11, N. Y. —F
Micarta Fabricators, Inc., 5324 Ravenswood Ave., Chicago 40, Ill.—F
Midwest Molding & Mfg. Co., 335 N. Whipple St., Chicago 12, Ill.—P
Mills Corp., Elmer E., 153 W. Huron St., Chicago, Ill. —EP
Mitchell Rand Insulation Co., 51 Murray St., New York 7, N. Y.—E
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—C, P
Mycalex Corp. of America, 60 Clifton Blvd., Clifton, N. J.—P
National Co., Inc., 61 Sherman St., Malden 48, Mass. —E
National Fabricated Products, 2650 W. Belden Ave., Chicago 47, Ill.—I
National Lock Co., 1902 Seventh St., Rockford, Ill. —C, P
National Molding Co., 2141 W. Washington Blvd., Los Angeles 7, Calif.—F, P
National Varnished Products Corp., 211 Randolph Ave., Woodbridge, N. J.—E
National Vulcanized Fibre Co., Maryland Ave. & Beech St., Wilmington 99, Del.—F
New England Radiocrafters, 1156 Commonwealth Ave., Boston 34, Mass.—F
Niagara Insul Bake Specialty Co., Inc., 483 Delaware Ave., Albany, N. Y.—P
Northeastern Plastics, 588 Commonwealth Ave., Boston 15, Mass.—P
Northern Industrial Chemical Co., 7-11 Elkins St., South Boston 27, Mass.—C, P
Norton Laboratories, Inc., 560 Mill St., Lockport, N. Y. —C, P
Olek, A. & Son, Inc., 4757-59 Melrose St., Philadelphia 37, Pa.—F
Oris Mfg. Co., Inc., Jackson St., Thomaston, Conn.—P
Panelyte—St. Regis Paper Co.
Parisian Novelty Co., 3510 S. Western Ave., Chicago 9, Ill.—F
Patent Button Co., 41 Brown St., Waterbury 88, Conn. —P
Peerless Roll Leaf Co., Inc., 4511 New York Ave., Union City, N. J.—F
Plastex Corp., 402 Mt. Vernon Ave., Columbus 3, Ohio —E, F
Plastic Accessories, Inc., 460 Broome St., New York 13, N. Y.—F
Plasticraft Products Co., 16 Hudson St., New York 13, N. Y.—F, P
Plastic Fabricators Co., 440 Sansome St., San Francisco 11, Calif.—F
Plastic Manufacturers, Inc., Fairfield Ave., Stamford, Conn.—P
Plastikmould—R. D. Werner Co., Inc.
Plastiktrim—R. D. Werner Co., Inc.
Plastoid Corp, 19 W. 44th St., New York 18, N. Y.—E
Plax Corp., 133 Walnut St., Hartford 5, Conn.—E, F
Plymold Corp., Lawrence, Mass.—F
Ports Mfg. Co., 3265 E. Belmont Ave., Fresno 3, Calif. —F
Precision Radio Co., 210 220 N. Western Ave., Los Angeles 4, Calif.—E, F, P
Printloid, Inc., 93 Mercer St., New York 12, N. Y.—F
Quad Mfg. Co., 462 N. Parkside Ave., Chicago 44, Ill. —F
R. E. C. Mfg. Corp., 1250 Highland St., Holliston, Mass. —F, P
Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—"Remler"—C, E, F, P
Richardson Co., Melrose Park, Melrose Park, Ill.—"Insurok"—C, E, F, P
Rogan Bros., 2001 S. Michigan Ave., Chicago, Ill.—P
Rohden Mfg. Co., 1753 N. Honore St, Chicago 22, Ill. —P
Royal Moulding Co., 69 Gordon Ave., Providence 5, R. I.—P
St. Regis Paper Co., 230 Park Ave., New York 17, N. Y. —"Panelyte"—F, P
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—E
Santay Corp., 351 N. Crawford Ave., Chicago 24, Ill. —C, P
Schott, Walter L. Co., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"Walsco"—E
Silicocks-Miller Co., 10 W. Parker Ave., Maplewood, N. J.—F
Slater, N. G. Corp., 3 W. 29th St., New York, N. Y.—F
Spaulding Fibre Co., Inc., 310 Wheeler St., Tonawanda, N. Y.—F
Special Electric Labs., 7657 S. Central Ave., Los Angeles 1, Calif.—F
Sponge Rubber Products Co., Shelton, Conn.—P
Standard Molding Corp., 460 Bacon St., Dayton 1, Ohio—C, F, P
Standard Products Co., 505 Blvd. Bldg., Detroit 2, Mich.—C, E, F, P
Standard Technical Devices, Inc., 129 Livingston St., Brooklyn 2, N. Y.—F
Stedman, Robert L., E. Main St., Oyster Bay, N. Y.—F
Stricker-Brunhuber Co., 19 W. 24th St., New York 10, N. Y.—E
Synflex—Industrial Synthetics Corp.
Synthane Corp., Oaks, Pa.—F, P
Syracuse Ornamental Co., 581 S. Clinton St., Syracuse 2, N. Y.—C, P
Taylor Fibre Co., Norristown, Pa.—F, P
Tech Art Plastics Co., 41-01 36th Ave., Long Island City, N. Y.—C, E, P
Traver Corp., 358-368 W. Ontario St., Chicago 10, Ill.—F
Trimm, Inc., 1770 W. Berteau Ave., Chicago 13, Ill.—P
Tri-United Corp., 390 Nye Ave., Irvington 11, N. J. —C, P
Ucinite Co., Div. United-Carr Fastener Corp., Newtonville, Mass.—E, F, P
Union Insulating Co., Box 351, Parkersburg, W. Va.—P
Universal Plastics Corp., 270 Madison Ave., New York, N. Y.—C, F, P
Varflex Corp., N. Jay St., Rome, N. Y.—E
Victory Mfg. Co., 1722-24 W. Arcade Pl., Chicago 12, Ill.—C, P
Vidal Research Corp., Central Airport, Camden 1, N. J.—C
Walsco—Walter L. Schott Co.
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—C, P
Welsh, Wm. H. Co., 2241 S. Indiana Ave., Chicago 16, Ill.—P
Wernco—R. D. Werner Co., Inc.
Werner, R. D. Co., Inc., 295 Fifth Ave., New York 16, N. Y.—"Wernco"—"Plastiktrim"—"Plastikmould" —E, P
Westinghouse Elec. Corp., East Pittsburgh, Pa.—F, P
Wheeling Stamping Co., Wheeling, W. Va.—P
White, S. S. Dental Mfg. Co., Industrial Div., 10 E. 40th St., New York, N. Y.—P
Willson Plastics Division, Willson Magazine Camera Co., 6022 Media St., Philadelphia 31, Pa.—C, E, F, P
Wilmington Fibre Specialty Co., P. O. Drawer 1028, Wilmington 99, Del.—E, F
Windman Bros., 3325 Union Pacific Ave., Los Angeles 23, Calif.—C, P

USE THE INDEX

This Directory of radio-electronic-television sources of supply is most complete and up-to-date, having been totally compiled and revised during 1946, with a final check-survey of manufacturers and their products completed as late as March and April of the present year.

(29) Power Rectifier Systems & Vibrators



Battery eliminators ..... **BE**
Electronic tube rectified ..... **VT**
Hand cranked units ..... **HC**
Inverters ..... **INV**
Mercury arc ..... **MA**
Metallic rectifiers ..... **M**
Rectifier power units ..... **PU**
Vibrator freq. changers ..... **VF**
Vibrator power packs ..... **VP**
Vibrators ..... **V**
Voltage regulators ..... **VR**

Aarons Radio Corp., 125 E. 46th St., New York 17, N. Y.—PU
Acme Electric & Mfg. Co., Cuba, N. Y.—VP
Acme Fire Alarm Co., Inc., 106 Seventh Ave., New York 11, N. Y.—M
Aerovox Corp., 740 Belleville Ave., New Bedford, Mass. —VF, VP, V
Airplane & Marine Instruments, Inc., Clearfield, Pa.—BE, VT, PU, VP
Airtronics Development Corp., 131-133 E. 3rd St., Dayton 2, Ohio—BE, VT, PU
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—VT
Ameco—American Electronics
American Commmunciations Corp., 306 Broadway, New York, N. Y.—BE, VT, VR
American Electronics, 37 E. 18th St., New York 3, N. Y.—"Ameco"—VT, PU, VR
American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—VT, INV, M, PU, VR
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—BE, INV, M, PU, VF, VP, V
American Transformer Co., Inc., 178 Emmet St., Newark 5, N. J.—VT, PU, VR
Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—INV, PU, VR
Apex Electric Mfg. Co., 1070 E. 152nd St., Cleveland, Ohio—INV
Applied Research Laboratories, 4336 San Fernando Rd., Glendale 4, Calif.—PU, VR
Auto Radio Filterpac—Benwood Linze Co.
Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—BE
Barker & Williamson, Upper Darby, Pa.—VT, MA, PU
Benwood Linze Co., 1815 Locust St., St. Louis 3, Mo. —"Auto Radio Filterpac"—"B-L"—BE, M, PU
B-L—Benwood Linze Co.
Boonton Radio Corp., 518 Main St., Boonton, N. J. —PU
Bradley Laboratories, Inc., 82 Meadow St., New Haven 10, Conn.—M
Breico Corp., 55 VanDam St., New York 13, N. Y. —VT, M, PU
Bunnell, J. H. & Co., 81 Prospect St., Brooklyn 1, N. Y.—PU
Burlington Instrument Co., N. Fourth St., Burlington, Iowa—VR
Carter Motor Co., 1608 Milwaukee Ave., Chicago 47, Ill.—HC, INV
Collins Radio Co., Cedar Rapids, Iowa—PU
Communication Measurements Laboratory, 120 Greenwich St., New York 6, N. Y.—VT
Communications Co., Inc., 300 Greco Ave., Coral Gables 34, Fla.—PU, VP
Conannt Electrical Laboratories, 6500 "O" St., Lincoln 5, Nebr.—M
Connecticut Telephone & Electric, Div. Great American Industries, Inc., Meriden 3, Conn.—BE, PU
Control Corp., 718 Central Ave., Minneapolis 14, Minn. —VR
Dietert, Harry W. Co., 9330 Roselawn Ave., Detroit 4, Mich.—VR
Drake, R. L. Co., 11 Longworth St., Dayton 2, Ohio —PU
Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—BE, VT
Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.—INV, VR
Eicor, Inc., 1501 W. Congress St., Chicago 7, Ill. —INV
Eleco—Electron Equipment Corp.
Electric Specialty Co., 214 South St., Stamford, Conn. —"Esco"—INV
Electrical Facilities, Inc., 4224 Holden St., Oakland 8, Calif.—"Rexselen"—M, PU
Electricoil Transformer Co., 421 Canal St., New York 13, N. Y.—BE, VT, M, PU
Electro Products Laboratory, 549 W. Randolph St., Chicago 6, Ill.—BE, VT, VP
Electron Equipment Corp., 917 Meridian Ave., So. Pasadena, Calif.—"Eleco"—VT, INV, MA, PU, VR
Electronic Control Corp., 1573 E. Forest Ave., Detroit, Mich.—VT
Electronic Enterprises, Inc., 65-67 Seventh Ave., Newark 4, N. J.—VT
Electronic Laboratories, Inc., 122 W. New York St., Indianapolis 4, Ind.—"Portapack", "Portapower"—INV, PU, VF, VP, V
Electronic Measurements Co., Red Bank, N. J.—BE, PU, VP, VR

Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—VP
Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—PU, VP, VR
Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—BE, VR
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—VR
Fansteel Metallurgical Corp., 2200 Sheridan Rd., North Chicago, Ill.—BE, M, PU
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—BE, M, PU, VP, V
Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20, N. Y.—BE, PU, VR
Ferris Instrument Co., 110 Cornelia St., Boonton, N. J. "Ferris"—VP
Fisher Research Laboratory, 1961 University Ave., Palo Alto, Calif.—VP
Flashtron—Thordarson Electric Mfg. Co.
Franklin Transformer Mfg. Co., 65 22nd Ave., N. E., Minneapolis 13, Minn.—M
Freed Transformer Co., 72 Spring St., New York 12, N. Y.—VR
Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—VR
General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—VT, PU, VP, VR
General Electric Co., 1285 Boston Ave., Bridgeport 2, Conn.—VT, M, VR
General Electric Co., Transmitter Div., Thompson Rd. Plant, Syracuse, N. Y.—PU
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—BE, PU
General Transformer Corp., 1250 W. Van Buren St., Chicago 7, Ill.—PU, VP
Gibbs, Thomas B. & Co., Delavan, Wis.—INV
Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—PU
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—PU
Green, W. Electric Co., Inc., 130 Cedar St., New York 6, N. Y.—VT, M, PU
Hannon Electric Co., 1605 Waynesburg Rd., S. E., Canton, Ohio—VT, M
Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—VR
Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—BE, VT, PU
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—BE, PU
Holtzer-Cabot, Div. First Industrial Corp., 125 Amory St., Roxbury 19, Mass.—INV, VR
Horni Signal Mfg. Corp., 421 W. 54th St., New York 19, N. Y.—BE, M, PU, VR
Howard Pacific Corp., 932 N. Western Ave., Los Angeles 27, Calif.—VT
James Vibrapowr Co., 1551 Thomas St., Chicago 22, Ill.—VP, V
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—V
Kurman Electric Co., 35-18 37th St., Long Island City, N. Y.—V
Langevin Co., Inc., 37 W. 65th St., New York 23, N. Y.—VT, PU
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.—INV
Link, Fred M., 125 W. 17th St., New York 11, N. Y.—VP
Lyman Electronic Corp., 12 Cass St., Springfield, Mass.—VT, PU, VR
Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—VP
Mallory, P. R. & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.—"Mallory Dry Disc"—BE, M, PU, VP, V
Mallory Dry Disc—P. R. Mallory & Co., Inc.
Mattern, F., Mfg. Co., 4647 N. Cicero Ave., Chicago 30, Ill.—VT
McColpin-Christie Corp., 4922 S. Figueroa St., Los Angeles 37, Calif.—VT, M
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—PU
Mellaphone Corp.,, 1462 E. Main St., Rochester 2, N. Y.—BE, VT, MA, PU
Mohawk Electric Mfg. Co., 60-62 Howard St., Irvington 6, N. J.—M, PU
Moulic Specialties Co., 1005-1007 W. Washington St., Bloomington, Ill.—VT
M & Z Industrial Development Co., 32 W. 12th St., Bayonne, N. J.—PU, VR
National Co., Inc., 61 Sherman St., Malden 48, Mass.—BE, PU, VP
North Electric Mfg. Co., Box 417, Galion, Ohio—BE, M
Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—VT
Oak Mfg. Co., 1260 Clybourn Ave., Chicago 10, Ill.—"Oak"—INV, VP, V
Pioneer Gen-E-Motor Co., 5841 Dickens Ave., Chicago 39, Ill.—INV
Point Mfg. Co., 5775 N. Ridge Ave., Chicago 26, Ill.—BE, M
Portapower—Electronic Laboratories, Inc.
Portapack—Electronic Laboratories, Inc.
Precision Electronics Co., 815 Washington St., Newtonville 60, Mass.—VT, PU, VR
Radiart Corp., 3571 W. 62nd St., Cleveland 2, Ohio—"Vipower"—VT, VP, V
Radio Receptor Co., Inc., 251 W. 19th St., New York 11, N. Y.—M
Radionic Controls, 3758 Belmont Ave., Chicago 18, Ill.—VR
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—"Rectifilter"—BE, VT, PU, VR
Ready Power Co., 3826 Grand River Ave., Detroit, Mich.—PU
Rectifier Engineering Co., 1809 E. 7th St., Los Angeles 21, Calif.—VT, M, PU
Rectifilter—Raytheon Mfg. Co.
Rexselen—Electrical Facilities, Inc.
Richardson-Allen Corp., 15 W. 20th St., New York, N. Y.—INV., VT, BE, M, PU, VR
Russell Electric Co., 364 W. Huron St., Chicago 11, Ill.—INV
Schauer Machine Co., 2060 Reading Rd., Cincinnati 2, Ohio—BE, M, PU
Schuttig & Co., Ninth & Kearny Sts., N. E., Washington 17, D. C.—PU
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—PU
Setchell Carlson, Inc., 2233 University Ave., St. Paul 4, Minn.—V
Small Motors, Inc., 1322 Elston Ave., Chicago 22, Ill.—INV
Sorensen & Co., Inc., 375 Fairfield Ave., Stamford, Conn.—VR
Sorgel Electric Co., 838 W. National Ave., Milwaukee 4, Wis.—VT, MA, M, PU
S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N. Y.—VR
Stancor—Standard Transformer Corp.
Standard Transformer Corp., 1500 N. Halsted St., Chicago 22, Ill.—"Stancor"—BE, VT, M, PU
States Co., 19 New Park Ave., Hartford 6, Conn.—VR
Stephens Mfg. Co., 10416 National Blvd., Los Angeles 34, Calif.—PU
Takk Corp., 28 W. Market St., Newark, Ohio—VT
Technical Apparatus Co., 1171 Tremont St., Boston 20, Mass.—VT
Teleregister Corp., 157 Chambers St., New York 7, N. Y.—PU
Thermionic Engineering Corp., 32 W. 12th St., Bayonne, N. J.—PU
Thompson, John E., Co., 1440 W. 47th St., Chicago 9, Ill.—VT
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—"Flashtron"—VR
Union Switch & Signal Co., Swissvale, Pa.—INV
U. S. Television Corp., 106 Seventh Ave., New York 11, N. Y.—VT, PU, VR
United Transformer Corp., 150 Varick St., New York 13, N. Y.—BE, VR
Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—V
Viber Co., 726 S. Flower St., Burbank, Calif.—V
Vipower—Radiart Co.
Vokar Corp., 7300 Huron River Drive, Dexter, Mich.—V
Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y.—VR
Weltronic Co., 19500 W. Eight Mile Rd., Detroit 19, Mich.—BE, VT, VR
Westinghouse Elec. Corp., East Pittsburgh, Pa.—BE, VT, MA, M, PU, VR
Wincharger Corp., E. 7th at Division, Sioux City 6, Iowa—INV

(30) Radar Devices

Altimeters (electronic) ..... **AL**
Aircraft Landing Control ..... **ALC**
Marine Navigational ..... **MN**
Plan-Position Indicators ..... **PPI**
Proximity Indicators ..... **PI**
Receivers (RCM, Razon, X Band) ..... **R**
Repeaters ..... **RP**
Oscilloscopes (Radar) ..... **O**

Air Communications, Inc., 2233 Grand Ave., Kansas City, Mo.—ALC
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—R
American Electronics, 37 E. 18th St., New York 3, N. Y.—AL
Bendix Radio Division, Bendix Aviation Corp., E. Joppa Rd., Baltimore 4, Md.—ALC
Bludworth Marine, Div. National-Simplex-Bludworth, Inc., 100 Gold St., New York 7, N. Y.—MN
DeMornay-Budd, Inc., 475 Grand Concourse, New York 51, N. Y.—MN
DuMont Laboratories, Inc., Allen B., 2 Main Ave., Passaic, N. J.—O, PPI, RP
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, L. I., N. Y.—R
Farnsworth Telev. & Radio Corp., 3700 Pontiac St., Ft. Wayne, Ind.—R
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—R
Galvin Mfg. Corp., 4545 Augusta Blvd., Chicago 51, Ill.—R
General Electric Co., 1 River Rd., Schenectady 5, N. Y.—R
Gilfillan Bros., Inc., 1815 Venice Blvd., Los Angeles 6, Calif.—ALC
Hallicrafters Co., 2611 Indiana Ave., Chicago, Ill.—R
Hazeltine Electronics Corp., 1775 Broadway, New York, N. Y.—R
Panoramic Radio Corp., 242-250 W. 55th St., New York 19, N. Y.—PI
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—ALC, PI, R
Radio Mfg. Engineers, Inc., 300-306 First Ave., Peoria 6, Ill.—R
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—R
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—R
Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y.—ALC, MN
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—R
Submarine Signal Co., 160 State St., Boston, Mass.—R
U. S. Television Mfg. Corp., 106 Seventh Ave., New York 11, N. Y.—ALC, PI, R, O, RP, PPI
Western Electric Co., 195 Broadway, New York 7, N. Y.—R
Westinghouse Electric Corp., 300 W. Baltimore St., Baltimore 3, Md.—R

(31) Receivers, Home & Commercial

Amateur ..... **A**
Automobile ..... **AU**
Battery portable ..... **BP**
Camera portable ..... **CP**
Construction kits ..... **CK**
Facsimile (home) ..... **FH**
Farm ..... **F**
FM Converters ..... **FV**
Phono-radio combinations ..... **PR**
Receivers, AM-FM ..... **FM**
Recorder-radio combinations ..... **RC**
Television combinations ..... **TC**
Television converters ..... **TV**

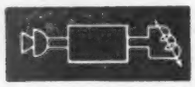
Automatic alarm ..... **AL**
Aviation ..... **AN**
Communication (AM) ..... **CA**
Communication (FM) ..... **CF**
Direction finding ..... **DF**
Facsimile (radiophoto) ..... **FR**
Fixed frequency ..... **FF**
Marine ..... **M**
Panoramic ..... **PN**
Police ..... **PL**
Railroad ..... **RR**

Abbott Instrument, Inc., 8 W. 18th St., New York, N. Y.—CA
Admiral Corp., 3800 Cortland St., Chicago, Ill.—"Admiral"—BP, FM, FV, PR, RC, TC
Air Associates, Inc., 5827 W. Century Blvd., Los Angeles 25, Calif.—A
Air Communications, Inc., 2233 Grand Ave., Kansas City, Mo.—DF, FM, FV, PR
Airadio, Inc., Melrose Ave. & Barry Place, Stamford, Conn.—CA, M
Aireon Corp., Fairfax & Funston Rds., Kansas City, Kans.—PR
Air King Prod. Co., Inc., 1523 63rd St., Brooklyn, N. Y.—"Air King", "Pathe"—BP, FM, FV, PR, TC
Airplane & Marine Instruments, Inc., Clearfield, Pa.—AN, DF, M, RR, AU, A
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Rd., College Park, Md.—A, FV, CA, M
Alden Products Co., 117 North Main St., Brockton 64, Mass.—FR
Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—"Knight"—BP, CK, FM, PR
American Communications Corp., 306 Broadway, New York, N. Y.—"American"—FM, FV, PR
American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—PR, RC, CA, CF, FF
Andrea Radio Corp., 43-20 34th St., Long Island City, N. Y.—"Andrea Radio"—BP, F, FM, FV, PR, TC
Ansley Radio Corp., 41 St. Joes Ave., Trenton 9, N. J.—"Paneltone"—F, FM, FV, PR, TC
Apex Industries, 192 Lexington Ave., New York 16, N. Y.—FM
Arvin—Noblitt-Sparks Industries, Inc.
Atomic Heater & Radio Corp., 104 Park Row, New York, N. Y.—"Electro"—FM
Audar, Inc., subsidiary John Meck Industries, Argos, Ind.—A
Autocrat Radio Co., 3855 N. Hamilton Ave., Chicago, Ill.—FM, FV, PR
Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston, Mass.—"Automatic", "Tom Thumb"—BP, F, FM, FV, PR
Autotone—Collins Radio Co.
Aviola Radio Corp., Sky Harbor Airport, Phoenix, Ariz.—"Aviola"—BP, CP, FM, FV, PR, RC, TV, A
Baronette Radio & Tube Corp., 220 Fifth Ave., New York, N. Y.—BP, FM, PR

Barr Electric Co., 1314 Forest Ave., Dallas, Tex.—FM, PR, RC
Bassett, Inc., Rex, 311 N.W. 1st Ave., Fort Lauderdale, Fla.—"Radair"—AN, M, PL
Bell Radio & Television, 125 E. 46th St., New York 17, N. Y.—FM, FV, PR, TC
Belmont Radio Corp., 5921 W. Dickens Ave., Chicago, Ill.—"Belmont"—A, BP, FM, FV, PR, TC, AU
Bendix Radio, Div. of Bendix Aviation Corp., East Joppa Rd., Baltimore, Md.—"Bendix Radio"—BP, F, FM, FV, PR, TC, AN, CA, DF, FF, RR
Bendix Aviation Corp., Pacific Division, 11600 Sherman Way, No. Hollywood, Calif.—CA
Biltmore Radio Corp., 15 Ave. A, New York 3, N. Y.—BP, FM, FV, PR, RC, TC
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—FV
Brunswick Radio & Telev. Div., Radio & Television, Inc., 244 Madison Ave., New York 16, N. Y.—PR, TC
Capehart Div., Farnsworth Telev. & Radio Corp., 3700 Pontiac St., Fort Wayne, Ind.—"Capehart", "Capehart-Panamuse"—FM, FV, PR
Cavalcade Industries, Inc., 39 S. La Salle St., Chicago, Ill.—BP, FM, PR
City Radio Co., 504 E. Washington St., Phoenix, Ariz.—"Mighty Atom"—A
Clarion—Warwick Mfg. Corp.
Clearsonic—U. S. Television Mfg. Co.
Collins Radio Co., 2920 First Ave., Cedar Rapids, Iowa—"Autotune"—CA, M, A
Colonial Radio Corp., 254 Rano St., Buffalo, N. Y.—FM, FV, PR, TC, AU, BP, CP
Columbia Electronic, Inc., 185 E. 122nd St., New York, N. Y.—FM, FV, PR
Communications Co., Inc., 300 Greco Ave., Coral Gables 34, Fla.—"Comco"—AN, CA, FF, RR
Communications Equipment Corp., 134 W. Colorado St., Pasadena 1, Calif.—CA, M, PL
Concert Master—Mercury Electronic Labs., Inc.
Concord Radio Corp. (formerly Lafayette Radio Corp.), 901 W. Jackson Blvd., Chicago 7, Ill.—PR, FM, FV, AU, BP, RC
Continental Electronic Ltd., 81 Pine St., New York, N. Y.—"Sky-Weight"—BP, PR
Coronet Radio & Television Corp., 176 Scranton Ave., Lynbrook, L. I., N. Y.—FM, FV, PR
Crosley Corp., 1329 Arlington St., Cincinnati, Ohio—AU, BP, FV, FM, PR, TC
Crystal Products Co., 1519 McGee Trafficway, Kansas City, Mo.—"Coronet"—FM, FV
Delco Radio, Div. of General Motors Corp., Kokomo, Ind.—"Delco Radio"—FM, FV, AU, BP, PR
Detrola Radio Corp.—See International Detrola Corp.
DeWald Radio Mfg. Corp., 440 Lafayette St., New York, N. Y.—"DeWald"—BP, FM, FV, PR
Dine, F. E. & Co., Inc., 2221 Warwick, Santa Monica, Calif.—A, BP, FM, FV
DuMont Laboratories, Inc., Allen B., 2 Main Ave., Passaic, N. J.—"Dumont", "Teleset"—TC
Dynavox Corp., 40-35 21st St., Long Island City, N. Y.—PR
Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—"Amphliphone"—BP, FM, PR
ECA Radio—Electronic Corp. of America.
Echophone Div., Hallicrafters Co., 2611 S. Indiana Ave., Chicago 16, Ill.—"Echophone"—FM, PR, TC, A, BP, F
Eckstein Radio & Television Co., 1400 Harmon Pl., Minneapolis, Minn.—"Eckco", "Karadio", "L'Tatro"—PR, AU, A, BP, F
Electrical Research & Mfg. Co., 3001 E. Pico Blvd., Los Angeles, Calif.—"Crest"—FM, BP
Electromatic Mfg. Co., 88 University Pl., New York, N. Y.—"Electromatic"—FM, PR, BP, CP, TC
Electronic Assembly Co., 9 Belvidere St., Boston 15, Mass.—"Tel-Rad Products"—CP
Electronic Corp. of America, 45 W. 18th St., New York, N. Y.—"Eca Radio"—FM, PR, TC, CP
Electronic Devices Co., 601 W. 26th St., New York, N. Y.—FM, FV, PR, TC, A, BP, CP, RC, TV
Electronic Engineers, 611 E. Garfield Ave., Garfield 5, Calif.—CA
Electronics, Inc., 645 Iowa St., Dubuque, Iowa—A, FM
Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—"Ranger"—AN, DF
Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—BP, CP, F, PR, RC, TC, FM
Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N. Y.—FM, PR, A
Fada Radio & Electric Mfg. Co., Inc., 30-20 Thomson Ave., Long Island City 1, N. Y.—"Fada"—BP, CP, F, FM, PR, RC, TC
Farnsworth Television & Radio Corp., Fort Wayne 1, Ind.—"Farnsworth", "Capehart", "Capehart-Panamuse"—AU, BP, RR, FM, PR, TC
Federal Telephone & Radio Corp., 591 Broad St., Newark, N. J.—"Federal"—FM, FV, PR, TC, AU, A
Ferrar, A. E., 55 W. 26th St., New York, N. Y.—BP, FM, PR
Finch Telecommunications, Inc., 10 E. 40th St., New York 16, N. Y.—FH
Fisher Radio Co., 41 E. 47th St., New York, N. Y.—FM, FV, TC, PR
Fisher Research Laboratory, 1961 University Ave., Palo Alto, Calif.—"Fisherfone"—A
Five Star Radio Co., 416 Broadway, Cambridge, Mass.—FM, PR, RC
Flush Wall Radio Co., 15 Washington St., Newark, N. J.—FM
F. M. Radio Mfg. Co., Inc., 10408 Superior, Cleveland 8, Ohio—"Pin-Up Radio"—FM, PR
Fonda—Jefferson-Travis Radio Mfg. Corp.
Freed-Eisemann—Freed Radio Corp.
Freed Radio Corp., 200 Hudson St., New York, N. Y.—"Freed-Eisemann"—FM, FV, PR
Galvin Mfg. Corp., 4545 Augusta Blvd., Chicago, Ill.—"Motorola"—FM, PR, TC, AU, A, BP, CP
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—"Tel-Rad"—A, BP, FM, PR
Garnet Radio Corp., 69 Glenwood Pl., East Orange, N. J.—FM
Garod Radio Corp., 70 Washington St., Brooklyn, N. Y.—FM, PR, TC, BP, CP, RC
Gem Radio & Television Co., 140 Liberty St., New York 16, N. Y.—A, FM, PR
General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—DF
General Electric Co., 1285 Boston Ave., Bridgeport, Conn.—"G.E."—FM, PR, TC, A, BP, CP
General Television & Radio Corp., Div., Portable Products Corp., 2701 Lehmann Ct., Chicago, Ill.—"General Radio"—FM, PR, BP, F
Gilfillan Bros., 1815 Venice Blvd., Los Angeles, Calif.—"Gilfillan"—FM, A
Globe Electronics, Inc., 225 W. 17th St., New York, N. Y.—FM, PR, BP
Grady Instrument Co., 11 Bailey Ave., Watertown, Mass.—DF
Gray Radio Co., 730 Okeechobee Rd., W. Palm Beach, Fla.—DF, M
Greene Co., Charlton L., 9 Eliot St., Watertown 72, Mass.—"Musical Master"—FM, PR
Hallicrafters Co., 2611 S. Indiana Ave., Chicago, Ill.—A, AN, CA, CF, DF, FR, M, PN, PL, RR
Hamilton Radio Corp., 510 6th Ave., New York, N. Y.—"Olympic"—BP, PR, FM, FV
Hammarlund Mfg. Co., 460 W. 34th St., New York, N. Y.—"Super-Pro"—A
Har-Cam—Harvey Radio Laboratories, Inc.
Harris Mfg. Co., 2422 W. 7th St., Los Angeles, Calif.—FM, PR, F
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—"Harcraft"—DF, FM, FV, PR, TC
Harvey Radio Laboratories, Inc., 447 Concord St., Cambridge, Mass.—"Har-Cam"—A
Harvey-Wells Electronics, Inc., Southbridge, Mass.—"Harvey-Wells"—CA, AN, DF, A
Heath Co., 305 Territorial, Benton Harbor, Mich.—AN
Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—AN, CA, M, PL, A
Higgins Industries, Inc., 2221 Warwick Ave., Santa Monica, Calif.—FM
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif—PR, FM, BP, CP, RC, TC
Howard Pacific Corp., 932 N. Western Ave., Los Angeles 27, Calif.—AM
Howard Radio Co., 1735 Belmont Ave., Chicago, Ill.—FM, PR, TC, BP, RC
Hudson American Corp., 25 W. 43rd St., New York, N. Y.—CA
Industrial Electronic Corp., 505 Court St., Brooklyn 31, N. Y.—"Simplon"—FM, PR
Industrial Electronics Co., 3370 Adeline St., Berkeley, Calif.—FM
Industrial Tool & Die Works, Inc., 2824 University Ave. S.E., Minneapolis, Minn.—"Industrial", "Automestic", "Mechanelec"—FM
International Detrola Corp., Beard Ave., Detroit 9, Mich.—FM, PR, TC, AU, BP, CP, F
Islip Radio Mfg. Corp., Beech St., Islip, N. Y.—"Irmco"—A, FM
Jameson Electronics Labs. Co., Inc., 115 Cooper Lane, Dayton, Ohio—"Jelco"—FM
Jefferson, Inc., Ray, 40 E. Merrick Rd., Freeport, L. I., N. Y.—A, DF, M
Jefferson-Travis Radio Mfg. Corp., 245 E. 23rd St., New York, N. Y.—"Fonda", "J.T."—AU, AN, CA, M
Jewel Radio Corp., 583 Sixth Ave., New York 11, N. Y.—BP, FM, PR
Kaar Engineering Co., 619 Emerson St., Palo Alto, Calif.—CA, M, PL, A
Karadio—Eckstein Radio & Television Co.
Keith Radio Products, Bedford, Ind.—"Keith"—FM, FV, PR
Kinetic Electronics Corp., 235 E. 42nd St., New York 17, N. Y.—BP, FM, PR
Kingston Radio Co., Inc., Kokomo, Ind.—FM, FV, PR
Kluge Electronics, Inc., 1031 N. Alvarado St., Los Angeles 26, Calif.—A
Lafayette Radio—Radio Wire Television Corp.
La Magna Mfg. Co., 51 Clinton Pl., East Rutherford, N. J.—FM
Laurehk Radio Mfg. Co., 3931 Monroe Ave., Wayne, Mich.—"Musique"—F, FM, CP
Lavoie Laboratories, Matawan-Freehold Rd., Morganville, N. J.—FM, PR
Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—AN
Lear Inc., 110 Ionia Ave., Grand Rapids, Mich.—"Learadio"—FM, PR, TC, BP, RC
Lertradio Corp., 4 St. Francis St., Newark, N. J.—FM
Lincoln Electronics Corp., 653 11th Ave., New York, N. Y.—FM, BP, CP, PR, RC, TC
Link, Fred M., 125 W. 17th St., New York, N. Y.—"Link Radio"—A
Magnavox Co., 2131 Bueter Rd., Ft. Wayne 4, Ind.—"Magnavox-Illustravox"—FV, PR
Magnavox-Illustravox—Magnavox Co.
Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—FM, FV, PR, TC, A, AN, M
Majestic Radio & Television Corp., St. Charles, Ill.—"Majestic Radio"—BP, FM, PR, TC
Marco Industries, 245 S. Beverly Dr., Beverly Hills, Calif.—"Marcola"—FM, AU, BP, PR, RC, TC
Maritime Radio Co., 24 Whitehall St., New York, N. Y.—FM, FV, TC
Mason Radio Products Co., 80 Prince St., Kingston, N. Y.—"Mason"—FM, PR, BP
McGrade Mfg. Co., E. W., 406 W. 34th St., Kansas City, Mo.—FM, FV, PR, A
Mechanelec—Industrial Tool & Die Works, Inc.
Meck Industries, John, Liberty at Pennsylvania, Plymouth, Ind.—PR, FM, BP
Mec-Rad Div., Black Industries, 1400 E. 222nd St., Cleveland 17, Ohio—PR
Mectron Corp., Lawrence, Mass.—BP, FM, PR, RC, TC
Medco Mfg. Co., 5 W. 45th St., New York, N. Y.—FM, PR, TC
Megard Corp., 1601 S. Burlington Ave., Los Angeles, Calif.—"Electronix"—FM, FV, PR, TC, A
Meissner Mfg. Co., 936 N. Michigan Ave., Chicago, Ill.—FM, FV, PR, TC, TV, A, BP, CP, RC
Mercury Electronic Laboratories Inc., 622 W. Kinzie St., Chicago 10, Ill.—"Concert Master"—BP, FM
Metropolitan Electronics & Instrument Co., 6 Murray St., New York 7, N. Y.—FM, PR, RC
Midland Mfg. Co., Decorah, Iowa—"Midland"—FM, FV
Midwest Radio Corp., 909 Broadway, Cincinnati, Ohio—"Midwest"—FM, PR
Millen Mfg. Co., James, 150 Exchange St., Malden, Mass.—"James Millen"—A
Minerva Corp. of America, 238 William St., New York, N. Y.—FM, PR, RC, TC, BP, CP
Motorola—Galvin Mfg. Corp.
Musicaire—Templetone Radio Mfg. Corp.
Music Master Radio Corp., 750 Main St., Hartford, Conn.—"Music Master"—FM, FV, PR, TC
Musitron Co., 223 W. Erie St., Chicago, Ill.—"Musitron"
National Co., Inc., 61 Sherman St., Malden, Mass.—"HRO", "NC"—A, AN, CA, FM
Noblitt-Sparks Industries, Inc., Columbus, Ind.—"Arvin"—F, FM, PR, BP
Nortneastern Engineering, Inc., Canal St., Manchester, N. H.—FM
Northern Radio Co., 2208 4th Ave., Seattle, Wash.—CA
Olmypic—Hamilton Radio Corp.
Packard Mfg. Corp., 2900 Columbia Ave., Indianapolis, Ind.—"Packard"—PR
Pacific Electronics, Sprague at Jefferson, Spokane 5, Wash.—"Crusader"—FM
Packard-Bell Co., 3443 Wilshire Blvd., Los Angeles, Calif.—"Packard-Bell", "Phonocord"—FM, FV, PR, TC
Pan American Electric Co., Inc., 132 Front St., New York 5, N. Y.—FM, TC, PR, BP
Panamuse—Farnsworth Television & Radio Corp.
Paneltone—Ansley Radio Corp.
Panoramic Radio Corp., 242-250 W. 55th St., New York 19, N. Y.—PN, A
Pathe—Air King Prod. Co., Inc.
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—F, FM, PR, RC, TC, AU, AN, BP
Pilot Radio Corp., 37-06 36th St., Long Island City 1, N. Y.—"Pilot Radio"—BP, F, FM, PR
Pin-Up-Radio—F. M. Radio Mfg. Co., Inc.
Pitometer Log Corp., 237 Lafayette St., New York 12, N. Y.—DF
Port-O-Matic Corp., 985 Madison Ave., New York, N. Y.—PR
Precision Specialties, 210 N. Western Ave., Los Angeles 4, Calif.—"Revell Plastics"—FM, PR
Premier Crystal Laboratories, Inc., 63 Park Row, New York 7, N. Y.—"Amphitron"—FM, PR
Press Wireless, Inc., 1475 Broadway, New York 18, N. Y.—A
Pro Electronics, 44 DeKalb Ave., Brooklyn, N. Y.—BP, CP, FM, PR
Promenette Radio & Television Corp., 1721 Elmwood Ave., Buffalo 7, N. Y.—FM
Purotone Radio Corp., 355 Main St., Poughkeepsie, N. Y.—FM, PR
Quality Industries, 25 E. Jackson Blvd., Chicago 4, Ill.—A
Radio Craftsmen, Inc., 1341 S. Michigan Ave., Chicago, Ill.—"Kitchenaire"—FM
Radio Development & Research Corp., 26 Cornelison Ave., Jersey City 4, N. J.—"Chromocord", "Chronovox"—A, BP, FM, PR
Radio Engineering Laboratories, Inc., 35-54 36th St., Long Island City, N. Y.—CA
Radio Frequency Laboratories, Inc., Boonton, N. J.—AN
Radiola—RCA-Victor, Div. Radio Corp. of America
Radio Laboratories, Inc., 2701 California Ave., S.W., Seattle 6, Wash.—A, BP
Radio Mfg. Engineers, Inc., 300-306 First Ave., Peoria 6, Ill.—A, AN, FF
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—AL, DF, M
Radio Navigational Instrument Corp., 305 E. 63rd St., New York, N. Y.—PR, DF
Radio Process Co., 7618 Melrose Ave., Los Angeles 46, Calif.—"Aeolian"—PR
Radio Receptor Co., 251 W. 19th St., New York 11, N. Y.—CA
Radio Wire Television Corp., 100 Sixth Ave., New York, N. Y.—"Lafayette Radio"—BP, FM, PR
Ragar Products Corp., 60 E. 42nd St., New York 17, N. Y.—FM
Rauland Corp., 4245 N. Knox Ave., Chicago 41, Ill.—"Lyric", "Magic-Tone", "Visitron"—BP, FM, PR

RayEnergy Radio & Television Corp., 32 W. 22nd St., New York, N. Y.—"Rayenergy"—BP, FM, PR, RC
RCA Victor Div., Radio Corp. of America, Camden, N. J.—"Radiola"—F, FM, PR, TC, AU, A, BP, CP
Record-O-Vox, Inc., 721 N. Martel Ave., Hollywood 46, Calif.—"Symphony"—FM, FV, PR, RC, TC, TV, A, BP, CP
Regal Electronics Corp., 20 W. 20th St., New York, N. Y.—"Regal", "Ultradyne"—FM, PR, TC
Remler Co., Lt., 2101 Bryant St., San Francisco, Calif.—BP, FM, PR
Rex Electronic Corp., 1313 W. Randolph St., Chicago 7, Ill.—FM, PR
RGH Mfg. Corp., 214 E. 41st St., New York 17, N. Y.—FM, PR
Rock-Ola Mfg. Corp., 800 N. Kedzie, Chicago, Ill.—RC
Schuttig & Co., Ninth & Kearny Sts., N.E., Washington 17, D. C.—AN, TC
Scophony Corp. of America, 527 5th Ave., New York, N. Y.—TC
Scott Radio Labs., Inc., 4450 Ravenswood Ave., Chicago, Ill.—"Scott"—A, FM, PR
Sentinel Radio Corp., 2020 Ridge Ave., Evanston, Ill.—"Sentinel"—BP, CP, F, PR, FM, FV
Setchell-Carlson, Inc., 2233 University Ave., St. Paul 4, Minn.—"Setchell-Carlson"—A, BP, FM
Sheridan Electronics Corp., 2850 S. Michigan Ave., Chicago 16, Ill.—"Sheridan", "Vogue"—F, FM, PR, BP
Signal Electronics, Inc., 114 E. 16th St., New York 3, N. Y.—FM, PR, BP
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—A, CK, CA
Sonora Radio & Television Corp., 325 N. Hoyne Ave., Chicago, Ill.—"Sonora"—BP, FM, FV, PR, TC, TV, AU
Sparks-Withington Co., Jackson, Mich.—"Sparton"—F, FM, PR, BP
Sparton—Sparks-Withington Co.
Speak-O-Phone Recording & Equipment Co., 23 W. 60th St., New York 23, N. Y.—RC
Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y.—AN, DF
Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago 14, Ill.—BP, F, FM, PR, TC
Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—AN
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—"Stromberg-Carlson"—F, FM, PR, RC, TC, BP
Super-Pro—Hammarlund Mfg. Co.
Symphonic Radio & Electronic Corp., 292 Main St., Cambridge 42, Mass.—"Symphonic"—BP, FM, PR
Tac Industries, 44 DeKalb Ave., Brooklyn, N. Y.—BP, CP, FM, PR
Tech-Master Products Co., 123 Prince St., New York 12, N. Y.—BP, FM, PR
Teleset—Allen B. DuMont Laboratories, Inc.
Teletone Radio Co., 609 W. 51st St., New York 19, N. Y.—"Teletone"—BP, FM, PR
Telequip Radio Co., 1901 S. Washtenaw Ave., Chicago, Ill.—PR, TC, TV
Telicon Corp., 851 Madison Ave., New York, N. Y.—"Telicon"—FM, PR, TC
Televox, Inc., 451 S. Fifth Ave., Mt. Vernon, N. Y.—FM, PR, RC
Temco—Transmitter Equipment Mfg. Co.
Templetone Radio Mfg. Corp., Garfield Ave., New London, Conn.—"Temple", "Musicair"—FM, PR, TC, BP, CP
Temple—Templetone Radio Mfg. Corp.
Tom Thumb—Automatic Radio Mfg. Co., Inc.
Transmitter Equipment Mfg. Co., Inc., 345 Hudson St., New York 14, N. Y.—"Hemco"—A
Trav-Ler Karenola Radio & Tel. Corp., 571 W. Jackson, Chicago, Ill.—FM
Trebor Radio Co., Box 497, Pasadena, Calif.—"Trebor"—F, BP
U. S. Television Mfg. Co., 3 W. 61st St., New York 23, N. Y.—"UST", "Clearsonic", "Window to the World"—BP, FM, PR, TC
UST—U. S. Television Mfg. Co.
Vibraloc Mfg. Co., 325 Miguel St., San Francisco, Calif.—FM, PR
Viewtone Co., 203 E. 18th St., New York, N. Y.—"Viewtone"—FM, PR, TC
V-Lectrical Engineering Co., 828 N. Highland Ave., Los Angeles, Calif.—"Calbest"—FM, PR, RC, TC
Walker, Inc., 403 W. 8th St., Los Angeles, Calif.—FM, FV
Warwick Mfg. Corp., 4640 W. Harrison St., Chicago, Ill.—"Clarion"—BP, FM, PR, TC
Watterson Radio Mfg. Co., 2700 Swiss Ave., Dallas, Texas—"Watterson"—FM, PR, BP, RC
Wells-Gardner & Co., 2701 N. Kildare Ave., Chicago 39, Ill.—"Wells-Gardner", "Arcadia"—FM, PR, AU, BP
Western Electric Co., 195 Broadway, New York, N. Y.—AN, DF, FF, M, PL
Western Sound & Electric Labs., Inc., 3512 W. St. Paul Ave., Milwaukee 8, Wis.—PR
Westinghouse Electric Corp., Receiver Div., Sunbury, Penn.—F, FM, PR, TC, BP, CP
Whiting & Davis, Inc., 23 W. Bacon St., Plainville, Mass.—FM, FV
Wilcox Electric Co., Inc., 1400 Chestnut St., Kansas City 1, Mo.—CA, FF
Wilcox-Gay Corp., 604 W. Seminary St., Charlotte, Mich.—F, RC
Window to the World—U. S. Television Mfg. Co.
Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.—"Zenith Radio"—BP, F, FM, PR, AU

(32) Recording Equipment & Blanks

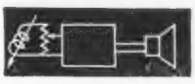


Code recorders ..... CR
Cutting heads ..... CH
Discs (blank) ..... D
Equalizers ..... E
Film recorders ..... F
Graphic recorders ..... RG
Magnetic wire recorders ..... MT
Needles (cutting) ..... CN
Record preforms and molding compounds ..... RP
Recording machines ..... RM
Recording machine assemblies ..... RA
Screws (feed) ..... S
Turntables ..... TT

Acton Co., Inc., H. W., 370 7th Ave., New York 1, N. Y.—CN
Advance Recording Products Co., 36-12 34th St., Long Island City, N. Y.—D
Air King Products Co., Inc., 1523 63rd St., Brooklyn 19, N. Y.—RA
Aireon Mfg. Corp., Electronics Div., Fairfax & Funston Rds., Kansas City 15, Kans.—MT
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—RG
Alliance Mfg. Co., Alliance, Ohio—TT
Allied Recording Products Co., 21-09 43rd Ave., Long Island City, N. Y.—CH, D, CN, RM, S, TT
Ansley Radio Corp., 21-10 49th Ave., Long Island City 1, N. Y.—MT
Astatic Corp., Harbor & Jackson, Conneaut, Ohio—CH, MT
Audio Devices, Inc., 444 Madison Ave., New York 22, N. Y.—"Audiodiscs", "Audiopoints"—D, CN
Audiodiscs—Audio Devices, Inc.
Audiopoints—Audio Devices, Inc.
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—RG
Autocrat Radio Co., 3855 N. Hamilton Ave., Chicago 18, Ill.—RM
Automatic Electric Co., 1033 W. Van Buren St., Chicago, Ill.—MT
Bakelite Corp., 30 E. 42nd St., New York 17, N. Y.—D, RP
Barker & Williamson, Upper Darby, Pa.—E
Bell Sound Systems, Inc., 1183 Essex Ave., Columbus 3, Ohio—RM
Bendix Radio Division, Bendix Aviation Corp., E. Joppa Rd., Baltimore 4, Md.—MT
Berndt Corp., E. M., Auricon Div., 5515 Sunset Blvd., Hollywood 28, Calif.—F, RM, RA
Biltmore Radio Corp., 15 Ave. A, New York 3, N. Y.—MT, RM
Black Seal—Gould-Moody Co.
Boehme, H. O., 915 Broadway, New York 10, N. Y.—CR, RG
Bristol Co., Waterbury 91, Conn.—RG, S
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—"Soundmirror"—CH, MT
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—CR
Caltron Co., Div. Frank Rieber, Inc., 11916 W. Pico Blvd., Los Angeles 34, Calif.—E, CH, D, MT, RM,
Capitol Records, Inc., Sunset & Vine, Hollywood 28, Calif.—D
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.—S
Commercial Radio Sound Corp., 575 Lexington Ave., New York 22, N. Y.—D, CN, RM, TT
Conn, Ltd., C. G., 1101 E. Beardsley Ave., Elkhart, Ind.—MT, RM
Continental Screw Co., New Bedford, Mass.—S
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—F
Diacoustic Laboratory, 1678 Channing Way, Pasadena 3, Calif.—CH, CN, RA
Dickson Co., 7420 Woodlawn Ave., Chicago 19, Ill.—RG
Dictaphone Corp., 420 Lexington Ave., New York 17, N. Y.—RM
Duodisc—Duotone Co.
Duotone Co., 799 Broadway, New York 3, N. Y.—"Duodisc"—CH, D, CN, RA, TT
Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—RM
Eldeen Co., 504 N. Water St., Milwaukee 2, Wis.—CN
Electronic Engineering Service & Labs., 114-38 Farmers Blvd., St. Albans 12, N. Y.—E, RM, RA, TT
Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—E
Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—E
Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—F
Elgin National Watch Co., 107 National St., Elgin, Ill.—CN
Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—D, CN, RM, S, TT
Engineering Laboratories, Inc., 610-624 E. 4th St., Tulsa 3, Okla.—F, RG, RM
Ericsson Screw Machine Products Co., Inc., 25 Lafayette St., Brooklyn 1, N. Y.—S
Esterline-Angus Co., Inc., P. O. Box 596, Indianapolis 6, Ind.—RG
Fairchild Camera & Instrument Corp., 8806 Van Wyck Blvd., Jamaica 1, N. Y.—CH, E, RM, TT
Favorite Mfg. Co., 105 E. 12th St., New York 3, N. Y.—D
Federal Recorder Co., Inc., 630 S. Wabash Ave., Chicago 5, Ill.—D, RM
Film Crafts Engineering Co., 36 W. 25th St., New York 10, N. Y.—F
Gates Radio Co., 220 Hampshire St., Quincy, Ill.—E, RM, RA, TT
Gatti, Inc., Aurele M., 1909 Liberty St., Trenton 9, N. J.—CN
Gem Phono Mfg., Inc., 7 W. 46th St., New York 19, N. Y.—D
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—D, CN, S
General Electric Co., Receiver Div., 1285 Boston Ave., Bridgeport 2, Conn.—MT
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—MT
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—RG
General Winding Co., 420 W. 45th St., New York 19, N. Y.—TT
Gentleman Products Div., Henney Motor Co., 1702 Cuming St., Omaha, Nebr.—RM
Globe Industries, Inc., 125 Sunrise Pl., Dayton 7, Ohio—RM, RA, TT
Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—F
Gould-Moody Co., 395 Broadway, New York 13, N. Y.—"Black Seal"—D, CN
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—D, E, TT
Gray Mfg. Co., 16 Arbor St., Hartford, Conn.—RM
Haddorff Piano Co., 630 S. Wabash Ave., Chicago 5, Ill.—D, RM
Hallicrafters Co., 2611 Indiana Ave., Chicago 16, Ill.—MT
Hammond Instrument Co., 2915 N. Western Ave., Chicago 18, Ill.—MT
Hart & Co., Inc., Frederick, 837 Main St., Poughkeepsie, N. Y.—CR, F, RM
Hartford Machine Screw Co., 476 Capitol Ave., Hartford 2, Conn.—S
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—RA, TT
Hathaway Instrument Co., 1315 S. Clarkson St., Denver, Colo.—RG
Higgins Industries, Inc., 2221 Warwick Ave., Santa Monica, Calif.—MT, RM
Home Recording Co., 699 E. 135th St., Bronx 54, N. Y.—"Melodise"—D
Hy-Pro Tool Co., New Bedford, Mass.—S
Industrial Screw & Supply Co., 717 W. Lake St., Chicago 6, Ill.—S
International Merit Products Corp., 254 W. 54th St., New York 19, N. Y.—CN, S
Jefferson-Travis Corp., 245 E. 23rd St., New York 10, N. Y.—F
J. F. D. Mfg. Co., 4117 Fort Hamilton Pkwy., Brooklyn 19, N. Y.—CN
Kluge Electronics Co., 1031 N. Alvarado St., Los Angeles 26, Calif.—MT
Lincoln Electronics Corp., 653 11th Ave., New York 19, N. Y.—MT
Manufacturers Screw Products, 216 W. Hubbard St., Chicago, Ill.—S
Mecanitron Corp., 711 Boyleston St., Boston 16, Mass.—CR
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—E
Melodisc—Home Recording Co.
Melody Record Supply, Inc., 314 W. 52nd St., New York 19, N. Y.—CN
Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—CH, E, F, MT, CN, RM, RA
Millco—M. A. Miller Mfg. Co.
Miller Mfg. Co., M. A., 1169 E. 43rd St., Chicago 15, Ill.—"Millco"—CN
Mirror Record Corp., 1133 Broadway, New York, N. Y.—D, MT
Municipal Instrument Co., 3246 Cuyler Ave., Berwyn, Ill.—MT
National Gasket & Washer Mfg. Co., 122 E. 25th St., New York 10, N. Y.—D
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, Ohio—S
New England Screw Co., Emerald St., Keene, N. H.—S
Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—E, RM, RA
Pacific Sound Equipment Co., 130 N. Beaudry Ave., Los Angeles 12, Calif.—"Port-Elec"—RM, RA, TT
Packard Bell Co., 1115 S. Hope St., Los Angeles 15, Calif.—RM, MT
Paraloy Co., 600 S. Michigan Ave., Chicago 5, Ill.—CN, RM
Patrick's Industries, 397 W. Marshall Ave., Ferndale 20, Mich.—RM
Permo, Inc., 6415 Ravenswood Ave., Chicago 26, Ill.—"Permo Point"—CN
Permo Point—Permo, Inc.
Phonograph Needle Mfg. Co., Inc., 42-46 Dudley St., Providence 5, R. I.—S
Plastic Fabricators Co., 440 Sansome St., San Francisco 11, Calif.—D
Poinsettia, Inc., Cedar Ave., Pitman, N. J.—RP
Port-Elec—Pacific Sound Equipment Co.

Presto Recording Corp., 242 W. 55th St., New York 19, N. Y.—CH, D, E, MT, CN, RM, RA, S, TT
Quality Industries, Electronic Dept., 25 E. Jackson Blvd., Chicago 4, Ill.—RM, RA
Radiad Service, 720 W. Schubert Ave., Chicago 14, Ill.—F, TT
Radiotechnic Laboratory, 1328 Sherman Ave., Evanston, Ill.—MT
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—CR, MT, RM
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—"RCA"—CH, D, E, F, MT, CN, RM, RA, TT
RecorDisc Corp., 395 Broadway, New York, N. Y.—D, CN
Recordit Co., 3028 Locust St., St. Louis 3, Mo.—D, CN, RM, TT
Record-O-Vox, Inc., 721 N. Martel Ave., Hollywood 46, Calif.—MT, RM
Recoton Corp., 212 5th Ave., New York N. Y.—D, CN
Reeves Sound Laboratories, Div. Reeves-Ely Laboratories, Inc., 62 W. 47th St., New York, N. Y.—F
Rek-O-Kut Co., 173 Lafayette St., New York 13, N. Y.—RM, TT
Riggs & Jeffreys, Inc., 73 Winthrop St., Newark 4, N. J.—RM
Robinson-Houchin Optical Co., 79 Thurman Ave., Columbus 6, Ohio—RM, RA
Russell Electric Co., 340 W. Huron St., Chicago 10, Ill.—RA
St. George Recording Equipment Corp., 76 Varick St., New York, N. Y.—MT, F, RM
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"Walsco"—S
Scott Radio Laboratories, Inc., E. H., 4450 Ravenswood Ave., Chicago 40, Ill.—MT
Scovill Mfg. Co., P. O. Box 98, Waterville 48, Conn.—S
Scully Machine Co., 62 Walter St., Bridgeport 8, Conn.—RM
Seeburg Corp., J. P., 1500 Dayton St., Chicago, Ill.—MT, RM
Shure Bros., 225 W. Huron St., Chicago 10, Ill.—CH, MT
Sillcocks-Miller Co., 10 W. Parker Ave., Maplewood, N. J.—D
Sonora Radio & Television Corp., 325 N. Hoyne Ave., Chicago 12, Ill.—MT
S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N. Y.—F, RM
Sound Devices Co, Inc., 160 E. 116th St., New York, N. Y.—D
Soundmirror—Brush Development Co.
SoundScriber Corp., 82 Audubon St., New Haven 11, Conn.—RM
Speak-O-Phone Recording & Equipment Co., 23 W. 60th St., New York 23, N. Y.—D, CN, RM, RA, S, TT
Stamford Metal Specialty Co., 428 Broadway, New York 13, N. Y.—S
Stephens Mfg. Co., 10416 National Blvd., Los Angeles 34, Calif.—E, F, CN, RM, RA, S, TT
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—MT
United Cinephone Corp., 65 New Litchfield St., Torrington, Conn.—TT
U. S. Television Corp., 106 Seventh Ave., New York 11, N. Y.—MT
United Transformer Corp., 150 Varick St., New York 13, N. Y.—E
Universal Microphone Co., 424 Warren Lane, Inglewood, Calif.—CH, RA
Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—MT
V-M Corp., 4th & Park Sts., Benton Harbor, Mich.—RM, RA
Walsco—Walter L. Schott Co.
Webster-Chicago Corp., 5622 Bloomingdale Ave., Chicago 39, Ill.—MT
Webster Electric Co., 1900 Clark St., Racine, Wis.—CH, MT
Western Electric Co., 195 Broadway, New York 7, N. Y.—MT
Western Sound & Electric Laboratories, Inc., 3512 W. St. Paul Ave., Milwaukee, Wis.—RM
Whe-Gro Co., 3028 Locust St., St. Louis 3, Mo.— D, CN, RM, RA, S
Wilcox-Gay Corp., Charlotte, Mich.—"Wilcox-Gay"—D, CN, RM
Willson Plastics Division, Willson Magazine Camera Co., 6022 Media St., Philadelphia 31, Pa.—D
WiRecorder Corp., Stroh Bldg., Detroit, Mich.—MT
Wire Recorder Development Corp., Armour Research Foundation, 8 S. Michigan Ave., Chicago 3, Ill.—MT
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—RA, TT
Zephyr Products Co., 160 E. 116th St., New York 29, N. Y.—D

(33) Records, Transcriptions & Playing Equipment



Automatic record changers .....ARC
Broadcast transcriptions .....BT
Coin record players .....CM
Electric phonographs .....EL
See also Receivers, AM-FM
Felt-flock, turntable .....F
Frequency records .....FR
Hand wound phonographs.....HW
Needles .....N
Pick-ups (crystal) .....PC
Pick-ups (dynamic) .....D
Pick-ups (magnetic) .....PM
Records .....R
Record compounds .....RC
Record pressers .....RM
Recording services .....RS
Sound effect records .....S
Transcription record players .....TR
Turntables .....TT

Acme Radio & Sound Labs., 3528 City Terr. Dr., Los Angeles, Calif.—RS
Acton Co., Inc., H. W., 370 7th Ave., New York 1, N. Y.—"Actone"—N
Actone—H. W. Acton Co., Inc.
Admiral Corp., 3800 W. Cortland St., Chicago 47, Ill.—ARC
Advance Research Corp., 214 W. 42nd St., New York, N. Y.—ARC, CM
Adver-Disc Co., 500 N. Western Ave., Los Angeles, Cal'f.—RS
Advertisers Recording Service, Inc., 113 W. 57th St., New York, N. Y.—RS
Air-Chek Co., 5546 Melrose Ave., Los Angeles, Calif.—RS
Aireon Mfg. Corp., Fairfax & Funston Rds., Kansas City 15, Kans.—ARC, CM
Alliance Mfg. Co., Alliance, Ohio—F, TT
Allied Record Mfg. Co., 1041 N. Las Palmas Ave., Los Angeles, Calif.—RS
American Products Mfg. Co., Oleander & Dublin Sts., New Orleans 18, La.—RC
Andrea Radio Corp., 43-20 34th St., Long Island City 1, N. Y.—ARC
ARA Records, 686 N. Robertson Blvd., Hollywood 46, Calif.—R
Arts Recording Co., Inc., 29 W. 57th St., New York, N. Y.—RS
Asch Recording Studios, 117 W. 46th St., New York 19, N. Y.—R, RS
Associated Recorders, 1511 N. Cahuenga, Los Angeles, Calif.—RS
Associated Studios, 6560 Hollywood Blvd., Los Angeles, Calif.—RS
Astatic Corp., Harbor & Jackson, Conneaut, Ohio—N, PC
Audak Co., 500 Fifth Ave., New York 18, N. Y.—"Audax"—PM
Audax—Audak Co.
Audio Devices, Inc., 444 Madison Ave., New York 22, N. Y.—"Audiopoint"—N
Audio Industries, Michigan City, Ind.—EL
Audiopoint—Audio Devices, Inc.
Audio-Scriptions, Inc., 1619 Broadway, New York, N. Y.—RS
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—FR
Austin Co., O., 335 Throop Ave., Brooklyn 21, N. Y.—F
Aviola Radio Corp., Phoenix, Ariz.—ARC
Bakelite Corp., 30 E. 42nd St., New York 17, N. Y.—RC
Barker & Williamson, Upper Darby, Pa.—EL
Beacon Record Co., 331 W. 51st St., New York, N. Y.—R
Bell Sound Systems, Inc., 1183 Essex Ave., Columbus 3, Ohio—EL, TR, TT
Bibletone, 354 Fourth Ave., New York 10, N. Y.—R
Biltmore Radio Corp., 15 Ave. A, New York 3, N. Y.—CM, EL
Birch—Boetsch Bros.
Black & White Record Co., 2117 Foster Ave., Brooklyn, N. Y.—R
Blue Bird—RCA Victor
Blue Note Records, 2125 Third Ave., New York, N. Y.—R, RS
Boetsch Bros., 221 E. 144th St., New York 51, N. Y.—"Birch"—ARC, EL
Bogen Co., Inc., David, 663 Broadway, New York 12, N. Y.—EL, TR, TT
Bost Records Co., 29 W. 57th St., New York 19, N. Y.—R, RS
Bradley, Richard & Associates, 20 N. Wacker Dr., Chicago, Ill.—RS
Bronze Recording Studio, 623 E. Vernon, Los Angeles, Calif.—RS
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—PC
Caltron Co., Div. of Frank Rieber, Inc., 11916 W. Pico Blvd., Los Angeles 34, Calif.—PM
Capehart Div., Farnsworth Telev. & Radio Corp., 3700 Pontiac St., Fort Wayne, Ind.—CM
Capitol Records, Inc., Sunset & Vine, Hollywood 28, Calif.—BT, EL, N, R
Carnegie Hall Recording Co., Carnegie Hall, New York, N. Y.—RS
Cellusuede Products, Inc., 500 N. Madison St., Rockford, Ill.—F
Chicago Recording Co., 221 N. LaSalle St., Chicago, Ill.—RS
Chicago Recording Studios, Inc., 64 E. Jackson St., Chicago, Ill.—RS
Chicago Sound Systems Co., 2124 S. Michigan Ave., Chicago, Ill.—ARC
Cine-Mart, 55 W. 42nd St., New York, N. Y.—RS
Clark Radio Equipment Corp., 4313 N. Lincoln Ave., Chicago 18, Ill.—TR, TT
Classic Point—Eldeen Co.
Coda Record Co., 1291 Sixth Ave., New York 19, N. Y.—R
Columbia Recording Corp., 1473 Barnum Ave., Bridgeport 8, Conn.—"Columbia", "Masterworks", "Okeh"—FR, N, R, RC, S, RS
Columbia Recording Corp., 799 7th Ave., New York, N. Y.—RS
Comet Record Co., 420 Lexington Ave., New York, N. Y.—R
Commercial Radio Sound Corp., 575 Lexington Ave., New York 22, N. Y.—ARC, TR, TT
Commodore Record Co., 415 Lexington Ave., New York, N. Y.—R
Communicating Systems, Inc., 201-209 E. 18th St., New York 3, N. Y.—EL
Conn. Telephone & Electric Div., Great American Industries, 70 Britannia St., Meriden, Conn.—EL
Continental Record Co., Inc., 265 W. 54th St., New York 19, N. Y.—R, RC, RM
Contract Specialties Co., 1743 LaBrosse St., Detroit 16, Mich.—F
Cosmopolitan Records, Inc., 745 Fifth Ave., New York, N. Y.—R
Crescent Tool & Die Co., 4140 W. Belmont Ave., Chicago, Ill.—ARC
Criterion Products Co., 19 W. 44th St., New York, N. Y.—R
Davis Music Co., Inc., Joe, 331 W. 51st St., New York 19, N. Y.—R
Decca Records, Inc., 50 W. 57th St., New York 19, N. Y.—"Decca"—R, RS
Diacoustic Laboratory, 1678 Channing Way, Pasadena 3, Calif.—N
Duotone Co., 799 Broadway, New York 3, N. Y.—N, TT
D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—N
Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—EL, ARC
Eastern Sound Recording Co., 46 W. 84th St., New York, N. Y.—RS
Eccles Disc Recordings, Inc., 6233 Hollywood Blvd., Los Angeles, Calif.—RS
Eldeen Co., 504 N. Water St., Milwaukee 2, Wis.—"Classic Point", "Maestro Point", "Merit Point", "Victory Point"—N
Electromatic Mfg. Corp., 88 University Pl., New York 3, N. Y.—EL
Electronic Corp. of America, 45 W. 18th St., New York 11, N. Y.—EL
Electronic Engineering Service & Laboratories, 114-38 Farmers Blvd., St. Albans 12, N. Y.—TR, TT
Electro Recording & Broadcasting Studio, 310 N. Verdugo Rd., Glendale, Calif.—RS
Electro-Vox Recording Studios, 5546 Melrose Ave., Los Angeles, Calif.—RS
Elgin National Watch Co., 107 National St., Elgin, Ill.—N
Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—ARC, EL, N, PC, TT
Empire Broadcasting Corp., 480 Lexington Ave., New York, N. Y.—RS
Erwood Co., 223 W. Erie St., Chicago 10, Ill.—ARC, TR
Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N. Y.—EL
Fairchild Camera & Instrument Corp., 8806 Van Wyck Blvd., Jamaica 1, N. Y.—PC, D, TR, TT
Farnsworth Television & Radio Corp., Fort Wayne 1, Ind.—ARC
Fidelitone—Permo, Inc.
Film Crafts Engineering Co., 36 W. 25th St., New York 10, N. Y.—PM
Fischer, Carl, Inc., 119 W. 57th St., New York, N. Y.—RS
Flock Process Co., Velvetone Div., 3 Quincy St., Norwalk, Conn.—F, TT
Gala Record Co., 350 Fifth Ave., New York, N. Y.—R
Galvin Mfg. Corp., 4545 Augusta Blvd., Chicago 51, Ill.—"Motorola"—ARC, N
Gamble Hinged Music Co., 228 S. Wabash, Chicago, Ill.—RS
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—EL, F, TR, TT
Garrard Sales Corp., 401 Broadway, New York 13, N. Y.—ARC, EL, N, PC, PM, TR, TT
Gates Radio Co., 220 Hampshire St., Quincy, Ill.—TR, TT
Gatti, Aurele M., Inc., 1909 Liberty St., Trenton 9, N. J.—N
Gem Phono Mfg., Inc., 7 W. 46th St., New York 19, N. Y.—N
Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—EL
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—F, N
General Electric Co., Receiver Div., 1285 Boston Ave., Bridgeport 2, Conn.—EL
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—PM
General Industries Co., Taylor & Olive Sts., Elyria, Ohio—ARC
General Instrument & Appliance Corp., 829 Newark Ave., Elizabeth 3, N. J.—ARC
General Phonograph Corp., Putnam, Conn.—N

Gentleman Products Div., Henney Motor Co., 1702 Cuming St., Omaha, Nebr.—EL
Glendale's Radio City, 310 N. Verdugo Rd., Glendale, Calif.—RS
Glenn Glen Sound Co., 1422 Lynn Pl., Los Angeles, Calif.—RS
Globe Industries, Inc., 125 Sunrise Pl., Dayton 7, Ohio —EL, TR, TT
Godfrey Manufacturing Co., 171 S. 2nd St., Milwaukee 4, Wis.—EL
Golden Point—Lowell Needle Co.
Goldentone—Lowell Needle Co.
Gould-Moody Co., 395 Broadway, New York 13, N. Y. —N
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—D, TR, TT
Guild Records, 665 Fifth Ave., New York, N. Y.—R
Hallicrafters Co., 2611 S. Indiana Ave., Chicago 16, Ill.—EL
Hamilton Radio Corp., 510 Sixth Ave., New York 11, N. Y.—EL
Harmax Recording Studios, 1697 Broadway, New York, N. Y.—RS
Harmonia Records, 1328 Broadway, New York, N. Y. —R
Harrison Recording Studios, 1697 Broadway, New York, N. Y.—RS
Hartley-Holt, 730 Fifth Ave., New York 19, N. Y.— TR, TT
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—ARC, TT
Herback & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—EL, TR
Heroservice, 45 W. 45th St., New York 19, N. Y.—S
H. & H. Recording Co., 6306 S. Cottage Grove Ave., Chicago, Ill.—RS
Hilo—Shure Bros.
Hollywood Music Recdg. Studios, 6019 Hollywood Blvd., Los Angeles, Calif.—RS
Hollywood Recording, 6225 Sunset Blvd., Los Angees, Calif.—RS
H. T. Hit Service, 105 Court St., Brooklyn, N. Y.—R
Independent Music Co., 65 University Pl., New York, N. Y.—RS
International Detrola Corp., 1501 Beard St., Detroit, Mich.—ARC
International Merit Products Corp., 254 W. 54th St., New York 19, N. Y.—N
Jackson Industries, 1708 S. State St., Chicago, Ill.—EL
Jamboree Records, Inc., 1650 Broadway, New York 19, N. Y.—R
Jensen Industries, Inc., 737 N. Michigan Ave., Chicago 11, Ill.—N
Keeney & Co., Inc., J. H., 6610 S. Ashland Ave., Chicago 36, Ill.—CM
Keynote Recordings, Inc., 522 Fifth Ave., New York 18, N. Y.—R
Kismet Record Co., 227 E. 14th St., New York 3, N. Y.—R
Kuehn, J. J., Sound Film Lab., 728 W. Buckingham, Chicago, Ill.—RS
Lewis Sound Film Productions, 71 W. 45th St., New York, N. Y.—RS
Lincoln Electronics Corp., 653 11th Ave., New York, N. Y.—ARC, EL, TR
Lindam & Romaine Recording Studios, 1408 W. 48th St., Los Angeles, Calif.—RS
Literary Classics, Inc., 1780 Broadway, New York, N. Y.—RS
Lowell Needle Co., 1 Wildore St., Putnam, Conn.— "Goldenpoint", "Goldentone"—N
MacGregor, C. P., Sound Studios, 729 S. Western Ave., Los Angeles, Calif.—RS
Maestro Point—Eldeen Co.
Magnavox Co., Fort Wayne 4, Ind.—ARC, EL
Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—ARC
Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—ARC
Majestic Radio & Television Corp., St. Charles, Ill.—R
Manor Record Co., 5 Pomona Ave., Newark 3, N. J.—R
Masterworks—Columbia Recording Corp.
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif. —EL
Melody Record Supply, Inc., 314 W. 52nd St., New York 19 N. Y.—N
Mercury Recording Studio, 232 E. Erie, Chicago, Ill. —RS
Merit Point—Eldeen Co.
Metropolitan Recording Studios, 1697 Broadway, New York, N. Y.—RS
Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—CM, N, D, PM
Miller Mfg. Co., M. A., 1169 E. 43rd St., Chicago 15, Ill.—"Millco"—N
Milwaukee Stamping Co., 800 S. 72nd St., Milwaukee 14, Wis.—ARC
Motorola—Galvin Mfg. Corp.
Musette Publishers, Inc., 113 W. 57th St., New York 19, N. Y.—R
Musicraft Corp., 40 W. 46th St., New York 19, N. Y. —R
Music Sound Track Serv., Inc., 1600 Broadway, New York, N. Y.—RS
Mutual Recording Co., 5205 Hollywood Blvd., Los Angeles, Calif.—RS
Muzak Corp., 151 W. 46th St., New York, N. Y.—RS
Muzak Transcriptions, Inc., 221 N. LaSalle St., Chicago, Ill.—RS
National Broadcasting Co., Inc., 222 W. North Bank, Chicago, Ill.—RS
National Broadcasting Co., Inc., Sunset & Vine, Los Angeles, Calif.—RS
National Die Casting Co., 600 N. Albany Ave., Chicago 12, Ill.—ARC, CM
National Recdg. & Film Corp., 20 N. Wacker Dr., Chicago, Ill.——RS
National Records Co., 1841 Broadway, New York 23, N. Y.—R
National Vocarium, 610 5th Ave., New York, N. Y.— RS
Newcomb Audio Products Co., 2815 S. Hill St., Los Angeles 7, Calif.—CM, EL, TR, TT
Nola Studios, 113 W. 57th St., New York, N. Y.—RS
Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—EL, TR, TT
Oak Mfg. Co., 1260 Clybourn Ave., Chicago 10, Ill.— ARC
Okeh—Columbia Recording Corp.
Pacific Electronics, W. 1011-1013 First Ave., Spokane 5, Wash.—ARC, PC, TR
Pacific Sound Equipment Co., 130 N. Beaudry Ave., Los Angeles 12, Calif.—"Port-Elec."—EL, F, N, PC, PM, TR, TT
Paraloy Co., 600 S. Michigan Ave., Chicago 5 Ill.—N
Paramount Radio Sales & Serv., 3477 Broadway, New York, N. Y.—RS
Permo, Inc., 6415 Ravenswood Ave., Chicago 26, Ill.— "Fidelitone", "Permo Point"—N
Permo Point—Permo, Inc.
Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill.—N
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.— ARC, EL, PC, D
Phonograph Needle Mfg. Co., Inc., 42-46 Dudley St., Providence 5, R. I.—"Supreme"—N
Phonola—Waters-Conley Co.
Phono-Rec. Mfg., Inc., 314 W. 52nd St., New York 19, N. Y.—N
Pickering & Crowe Laboratories, 475 Fifth Ave., New York 17, N. Y.—PM
Poinsettia, Inc., Cedar Ave., Pitman, N. J.—R, RC, RM
Port-Elec—Pacific Sound Equipment Co.
Precise Development Parts, 28 N. Loomis St., Chicago, Ill.—ARC
Precision Recording Co., 1912 S. Cursen Ave., Los Angeles, Calif.—RS
Presto Recording Corp., 242 W. 55th St., New York 19, N. Y.—N, PM, TR, TT
Radiad Service, 720 W. Schubert Ave., Chicago 14, Ill.—TR, TT
Radio Frequency Laboratories, Inc., Boonton, N. J.— EL
Radio Recorders, Inc., 7000 Santa Monica Blvd., Los Angeles, Calif.—RS
Radio Recording Studio, 1619 Broadway, New York, N. Y.—RS
Rauland Corp., 4245 N. Knox Ave., Chicago 41, Ill.— TR
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—ARC, EL, F, FR, N, PC, D, PM, R, RC, RM, S, TR, TT
RCA Victor Division, Victor Recording Studio, 155 E. 24th St., New York, N. Y.—RS
Recordit Co., 3028 Locust St., St. Louis 3, Mo.—N, RC, S, TR, TT
Record-O-Shers Recording Studios, 6560 Hollywood Blvd., Los Angeles, Calif.—RS
Record-O-Vox, Inc., 721 N. Martel Ave., Hollywood 46, Calif.—ARC, EL, PC, CM
Recoton Corp., 212 5th Ave., New York, N. Y.—N
Red Seal—RCA Victor
Reeves Sound Studios, Inc., 1600 Broadway, New York, N. Y.—RS
Regal Electronics Corp., 20 W. 20th St., New York 11, N. Y.—TR
Rek-O-Kut Co., 173 Lafayette St., New York 13, N. Y. —TR, TT
Riggs & Jeffreys, Inc., 73 Winthrop St., Newark 4, N. J.—EL, TR
Rockhill Radio, Inc., 18 E. 50th St., New York, N. Y. —RS
St. George Recording Equipment Corp., 76 Varick St., New York, N. Y.—PM
Sandwick Associates, L. M., 223 W. Erie St., Chicago 10, Ill.—EL, HW, TR, TT
Savoy Record Co., 58 Market St., Newark, N. J.—R
Say-Way Industries, P. O. Box 117, Harper Sta., Detroit 13, Mich.—R
Schirmer, G., Inc., 3 E. 43rd St., New York, N. Y. —RS
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"Walsco"—F, RC
Schulmerich Electronics, Inc., 220-228 N. Main St., Sellersville, Pa.—TR
Scranton Record Co., 100 W. Poplar St., Scranton 9, Pa.—CM, R
Seeburg Corp., J. P., 1510 N. Dayton St., Chicago 22, Ill.—ARC, CM, EL
Seeco Records, Inc., 1393 Fifth Ave., New York 29, N. Y.—R
Seva Record Co., 45 E. 49th St., New York 17, N. Y. —R
Shure Bros., 225 W. Huron St., Chicago 10, Ill.— "Hilo"—"Zephyr"—N, PC
Signal Electronics, Inc., 114 E. 16th St., New York 3, N. Y.—EL
Simpson Mfg. Co., Mark, 188 W. 4th St., New York 14, N. .—ARC, EL, TR
Sonart Record Corp., 251 W. 42nd St., New York, N. Y. —R
Songcraft, Inc., 1650 Broadway, New York, N. Y. —RS
Sonora Products, Inc., 2023 W. Carroll Ave., Chicago 12, Ill.—R
Sorkin Music Co., 251 Fourth Ave., New York 10, N. Y.—"Beltone"—M
Sound-On-Film Recording Studios, 177 Madison Ave., New York, N. Y.—RS
Sound Workshop, 445 S. La Cienega Blvd., Los Angeles, Calif.—RS
Souvenir Recording Studio, 55 Olvera St., Los Angeles, Calif.—RS
Spanish Sound Studios, 41 E. 42nd St., New York, N. Y.—RS
Sparkes Mfg. Co., Ltd., 318 Jefferson St., Newark 5, N. J.—ARC
Speak-O-Phone Recording & Equipment Co., 23 W. 60th St., New York 23, N. Y.—EL, N
Spot Film Productions, Inc., 339 E. 48th St., New York, N. Y.—RS
Standard Phonograph Co., 163 W. 23rd St., New York, N. Y.—R
Standard Radio, 1 E. 54th St., New York, N. Y.—RS
Standard Radio, 6404 Hollywood Blvd., Los Angeles, Calif.—RS
Starr Piano Co., 1344 S. Flower, Los Angeles, Calif. —RS
Stephens Mfg. Co., 10416 National Blvd., Los Angeles 34, Calif.—R, TR, TT
Sterling Record Co., 7 W. 46th St., New York, N. Y. —R
Studio & Artists Recorders, 6107 Sunset Blvd., Los Angeles, Calif.—RS
Supreme—Phonograph Needle Mfg. Co.
Sweum Studios, 636 S. Ardmore Ave., Los Angeles, Calif.—RS
Technical Radio Co., 275 9th St., San Francisco, Calif. —EL, PM, TR, TT
Tel-A-Recording, Inc., 2 W. 46th St., New York, N. Y.—RS
Telefilm, Inc., 6039 Hollywood Blvd., Los Angeles, Calif.—RS
Toogood, L. S., Recording Co., 221 N. LaSalle St., Chicago, Ill.—RS
Transcription Broadcasting Studios, 1650 Broadway, New York, N. Y.—RS
Transcriptions, Inc., 29 W. 57th St., New York, N. Y. —RS
Turner Co., 909 17th St., N. E., Cedar Rapids, Iowa —PM
United Broadcasting Co., 64 E. Lake St., Chicago, Ill.—RS
United Cinephone Corp., 65 New Litchfield St., Torrington, Conn.—PM, TR, TT
United Loose Leaf Co., 233 Spring St., New York 13, N. Y.—RA
United Research Labs., 1650 Broadway, New York, N. Y.—RS
U. S. Record Corp., 400 Madison Ave., New York, N. Y.—RS
Universal Microphone Co., 424 Warren Lane, Inglewood, Calif.—FR
Universal Recorders, 6757 Hollywood Blvd., Los Angeles, Calif.—RS
Universal Recording Co., Inc., 1270 Sixth Ave., New York, N. Y.—RS
Urab Recording Studio, 245 W. 34th St., New York, N. Y.—RS
Victor—RCA Victor
V-M Corp., 4th & Park Sts., Benton Harbor, Mich. —ARC
Voice of the Church, 500 N. Western Ave., Los Angeles, Calif.—RS
Walsco—Walter L. Schott Co.
Warner Bros. Broadcasting Corp., 5833 Fernwood Ave., Los Angeles, Calif.—RS
Waters-Conley Co., Rochester, Minn.—"Phonola"— EL, HW, N
Webster-Chicago Corp., 5610 Bloomingdale Ave., Chicago 39, Ill.—ARC, EL
Webster Electric Co., 1900 Clark St., Racine, Wis.— PC, PM
Western Electric Co., 195 Broadway, New York 7, N. Y.—D, PM, TR
Western Sound & Electric Laboratories, Inc., 3512 W. St. Paul Ave., Milwaukee, Wis.—EL
Whe-Gro Co., 3028 Locust St., St. Louis 3, Mo. —EL, F, N, TT
Wilcox-Gay Corp., Charlotte, Mich.—ARC, N
Williams Mfg. Co., 161 W. Huron St., Chicago 10, Ill. —CM
Willson Plastics Div., Willson Magazine Camera Co., 6022 Media St., Philadelphia 31, Pa.—RM
WOR Recording Studios, 1440 Broadway, New York 18, N. Y.—R, RS
World Broadcasting System, Inc., 711 Fifth Ave., New York, N. Y.—RS
Worner Electronic Devices, 609 West Lake St., Chicago 6, Ill.—EL
Wurlitzer Co., Rudolph, Niagara Falls Bldg., No. Tonawanda, N. Y.—ARC, CM
Wynn Mfg. Div., Hudson Supply Co., 401 N. 27th St., Richmond 23, Va.—EL
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—EL

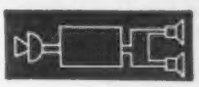
Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.—PC, TR
Zephyr—Shure Bros.

(34) Resistors & Volume Controls

Attenuators (precision) .....A
Fixed composition .....FC
Fixed wirewound .....FW
High frequency resis. slug .....HR
Industrial fixed I
Neg. temp. coeff. resis. .....N
Plug-in (tubes) .....PT
Power rheostats .....PR
Precision .....PRE
Slide-wire potentiometers .....S
Supressors .....SU
Variable V
Volume controls VC

Aerolite Electronic Hardware Corp., 24 Cliff St., Jersey City 6, N. J.—FW, S
Aerovox Corp., 740 Belleville Ave., New Bedford, Mass.—FC, FW, S
Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis.—"Bradleyometer", "Bradleyunit"—FC, PR, SU, V, VC
Alpha Meter Service, 71 Nassau St., New York 7, N. Y.—PRE
Amalgamated Electronics Associated, 60 E. 42nd St., New York 17, N. Y.—FW, I, PR, V, VC
American Coil & Engineering Co., 1271 N. Hermitage Ave., Chicago 22, Ill.—FW
Amperite Co., 561 Broadway, New York, N. Y.—V
Associated Research, Inc., 231 S. Green St., Chicago 7, Ill.—FW, PRE
Atlas Resistor Co., 423 Broome St., New York 13, N. Y.—"Atlas"—FW, V
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—A
Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—FW
Barker & Williamson, Upper Darby, Pa.—FW, V
Biddle Co., James G., 1211 Arch St., Philadelphia 7, Pa.—PR
Bradleyometer—Allen-Bradley Co.
Bradleyunit—Allen-Bradley Co.
Brown Devil—Ohmite Mfg. Co.
Brown Engineering Co., 4635 S.E. Hawthorne Blvd., Portland 15, Ore.—FW, PRE, S, V
Candohms—Muter Co.
Carborundum Co., Globar Div., Buffalo Ave., Niagara Falls, N. Y.—FC, I, N, SU
Carter Radio Division, Precision Parts Co., 213 Institute Place, Chicago 10, Ill.—FW, V
Centralab Div. of Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—PR, V, VC
Chicago Telephone Supply Co., W. Beardsley Ave., Elkhart, Ind.—V, VC
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—V, VC
Clarostat Mfg. Corp., 130 Clinton St., Brooklyn 2, N. Y.—"Clarostat"—A, FC, FW, HR, I, N, PT, PR, PRE, V, VC
Collins Radio Co., Cedar Rapids, Iowa—A, VC
Conn, Ltd., C. G., 1101 E. Beardsley Ave., Elkhart, Ind.—E
Corning Glass Works, Corning, N. Y.—A
Corrib—Ohmite Mfg. Co.
Cover Dual Signal Systems, Inc., Div. Electra-Voice Corp., 5215 N. Ravenswood Ave., Chicago 40, Ill.—PRE
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.—FW, I, PR, S
Daven Co., 191 Central Ave., Newark 4, N. J.—A, PRE, VC
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—PRE
DeJur Amsco Corp., Northern Blvd. at 45th St., Long Island City 1, N. Y.—PR, PRE, V
Dividohm—Ohmite Mfg. Co.
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza S., Long Island City 1, N. Y.—FW
Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—A, FW, N, PRE, S
Eastern Specialty Co., 3617 N. 8th St., Philadelphia 40, Pa.—PRE
Electrical Reactance Corp., 49 Elm St., Franklinville 3, N. Y.—FW, PRE, V
Electronic Components Co., 423 N. Western Ave., Los Angeles 4, Calif.—A
Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—A, FW
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—FW, I, PR, PRE, S, V
Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—FC, FW, PT, VC
Erie Resistor Corp., 640 W. 12th St., Erie, Pa.—FC, SU
Ex-Stat—Tilton Electric Co.
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—A, PRE, V
Gamewell Co., 1238 Chestnut St., Newton Upper Falls 64, Mass.—V
General Electronics Mfg. Co., 2225 S. Hoover St., Los Angeles 7, Calif.—FW, PRE
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—"G-R"—A, FW, HR, PR, PRE, S, V, VC
General Winding Co., 420 W. 45th St., New York 19, N. Y.—FW, PRE
Giannini & Co., Inc., G. M., Autoflight Instrument Div., 4522 Lankershim Blvd., North Hollywood, Calif.—V
G-M Laboratories, Inc., 4300 N. Knox Ave., Chicago 41, Ill.—S
Goodall Electric Mfg. Co., 3rd and Main St., Ogallala, Nebr.—FC
G-R—General Radio Co.
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—A
Groves Corp., 42 N. Sprigg St., Cape Girardeau, Mo.—FW, PRE, V
Haines Mfg. Co., 248-274 McKibbin St., Brooklyn 6, N. Y.—FW
Hanovia Chemical & Mfg. Equipment, 233 N. J. R. R. Ave., Newark 5, N. J.—FW
Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N. J.—FW, I, PR, PRE, S, V
Helipot Corp., 1015 Mission St., So. Pasadena, Calif.—PRE, S, V
Hickok Electrical Instrument Co., 10514 DuPont Ave., Cleveland, Ohio—PRE
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—HR, I, N
Industrial Instruments, Inc., 17 Pollock Ave., Jersey City 5, N. J.—PRE
Instrument Resistors Co., 25 Amity St., Little Falls, N. J.—FW, I, PRE
International Resistance Co, 401 N. Broad St., Philadelphia 8, Pa.—"IRC"—A, FC, FW, HR, I, N, PR, PRE, S, SU, V, VC
IRC—International Resistance Co.
Jeffers Electronics, Hoover St., DuBois, Pa.—FW, N
J. F. D. Mfg. Co., 4111 Ft. Hamilton Pkwy., Brooklyn 19, N. Y.—"JFD"—PT, SU
Keystone Carbon Co., Inc., 1935 State St., St. Marys, Pa.—N
Lectrohm, Inc., 5125 W. 25th St., Cicero 50, Ill.—FW, V
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.—S, PRE
Lenoxite Div., Lenox, Inc., 65 Prince St., Trenton 5, N. J.—HR, PRE
Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn.—S
Madison Electrical Products Corp., 78 Main St., Madison, N. J.—"Mepco"—FW, I, PRE
Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—HR
Mallory & Co., Inc., P. R., 3029 E. Washington St., Indianapolis 6, Ind.—A, FW, V, VC
Marion Electrical Instrument Co., Stark Street Gate, Manchester, N. H.—FW, PRE
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—A
Mepco—Madison Electrical Products Corp.
Microhm—Precision Resistor Co.
Miller Electro-Research Labs., 4021 S. Whitnall Ave., Milwaukee 7, Wis.—PRE
Milwaukee Resistor Co., 748 W. Virginia St., Milwaukee 4, Wis.—FW, I, V
Monitor Controller Co., 51 S. Gay St., Baltimore 2, Md.—FW, I, PR
Multivolt—Ohmite Mfg. Co.
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—"Candohms", "Zipohms"—FW, V
National Electric Controller Co., 5307 Ravenswood Ave., Chicago, Ill.—"National"—PR
Nilsson Electrical Laboratory, Inc., 103 Lafayette St., New York 13, N. Y.—PRE
Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio—FC, FW, SU
Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill.—"Brown Devil," "Corrib," "Dividohm," "Multivolt," "Riteohm," "Wirewatt"—FW, I, PR, PRE, S, SU, V
Ohmspun—States Co.
Precision Resistor Co., 334 Badger Ave., Newark, N. J.—"Microhm"—A, I, PR, PRE, RW, V
Presto Electric Co., 4511 New York Ave., Union City, N. J.—FW, PRE, S
Quad Mfg. Co., 462 N. Parkside Ave., Chicago 44, Ill.—A
Reimers Electric Appliance Co., 596 56th St., West New York, N. J.—FW, PRE
Rex Rheostat Co., 3 Foxhurst Rd., Baldwin, L. I., N. Y.—FW, I, PR, S, V
Richardson-Allen Corp., 15 W. 20th St., New York 11, N. Y.—PRE
Riteohm—Ohmite Mfg. Co.
Rubicon Co., Ridge Ave. at 35th St., Philadelphia 32, Pa.—FW, PRE
Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—PRE
Shallcross Mfg. Co., Jackson & Pusey Aves., Collingdale, Pa.—FW, PRE, A
Speer Resistor Corp., Theresia St., St. Marys, Pa.—FC, N
Sprague Electric Co., 189 Beaver St., North Adams, Mass.—FW, I, PRE
Sprague Products Co., North Adams, Mass.—FW, I, PRE
Stackpole Carbon Co., P. O. Box 327, St. Marys, Pa.—FC, SU, V, VC
States Co., 19 New Park Ave., Hartford 6, Conn.—"Ohmspun"—FW
Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.—N
Tech Laboratories, 337 Central Ave., Jersey City 7, N. J.—A, VC
Techtmann Industries, Inc., 828 N. Broadway, Milwaukee 2, Wis.—I
Tilton Electric Corp., 15 E. 26th St., New York, N. Y. "Ex-Stat"—FW, SU, VC
Trefz Mfg. Co., 38-11 Main St., Flushing, N. Y.—FW, I, PT, V, VC
Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—FW, PT, V, VC
Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio—FC, PRE
Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y.—FW, I, PR, S, V
Westinghouse Elec. Corp., East Pittsburgh, Pa.—FW, I, N, PR, PRE
Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—FW, HR
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.—S
White Dental Mfg. Co., S. S., Industrial Div., 10 E. 40th St., New York, N. Y.—FC
Winslow Co., 9 Liberty St., Newark 5, N. J.—PRE
Wirewatt—Ohmite Mfg. Co.
Wirt Co., 5221 Greene St., Philadelphia 44, Pa.—FW, I, SU, V, VC
Zipohms—The Muter Co.

(35) Sound Systems, Intercommunicators & Hearing Aids



Acoustic materials .....AM
Bell, buzzers .....B
Carrier current systems CC
Electronic megaphones .....EM
Electronic musical equip. .....E
Hearing aids .....H
Intercommunicators I
Mobile amplifiers .....M
Power amplifiers .....PA
Preamplifiers .....PRE
Remote controllers .....RC
Sound systems (complete) .....SS
Car-top speaker racks .....CR

Advance Research Corp., 214 W. 42nd St., New York, N. Y.—AM
Airplane & Marine Instruments, Inc., Clearfield, Pa.—PA, PRE
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—PA, PRE, SS
Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—I, PA, PRE
Altec Lansing Corp., 1161 N. Vine St., Hollywood 28, Calif.—PA, PRE, SS
Ameco—American Electronics
American Coil & Engineering Co., 1271 N. Hermitage Ave., Chicago 22, Ill.—B, H, I
American Communications Corp., 306 Broadway, New York, N. Y.—EM, I, PA, PRE, SS
American Earphone Co., 10 E. 43rd St., New York 17, N. Y.—H
American Electronics, 37 E. 18th St., New York 3, N. Y.—"Ameco"—M, PA, PRE, SS
American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—PA, PRE, SS
Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—M, PA, PRE, SS
Ampro Corp., 2839-51 N. Western Ave., Chicago 18, Ill.—SS
Ansley Radio Corp., 21-10 49th Ave., Long Island City 1, N. Y.—E
Atlas Sound Corp., 1443 39th St., Brooklyn 18, N. Y.—CR, EM, PA, PRE, SS
Audiograph—John Meck Industries
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—PRE, SS
Aurex Corp., 1117 N. Franklin St., Chicago, Ill.—H, PRE
Auth Electric Specialty Co., Inc., 422-430 E. 53rd St., New York 22, N. Y.—B, I, SS

Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—I

Aviola Radio Corp., 703 W. Ivy St., Glendale 4, Calif.—I, SS

Aviometer Corp., 370 W. 35th St., New York 1, N. Y.—I

Bank's Mfg. Co., 1105 W. Lawrence Ave., Chicago 40, Ill.—E, I, PA, PRE, RC, SS

Barker & Williamson, Upper Darby, Pa.—M, PA, PRE, RC

Belfone—Bell Sound Systems, Inc.

Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—SS

Bell Sound Systems, Inc., 1183 Essex Ave., Columbus 3, Ohio—"Belfone"—E, I, M, PA, PRE, RC, SS

Bendix Radio Division, Bendix Aviation Corp., E. Joppa Rd., Baltimore 4, Md.—I, M

Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, North Hollywood, Calif.—I, M

Biltmore Radio Corp., 15 Ave. "A", New York 3, N. Y.—I, SS

Bogen Co., Inc., David, 663 Broadway, New York 12, N. Y.—I, M, PA, PRE, RC, SS

Boom Electric & Amplifier Co., Inc., 1227 W. Washington Blvd., Chicago 7, Ill.—I, SS

Breico Corp., 55 Van Dam St., New York 13, N. Y.—E, I, M, PA, PRE, RC, SS

Caltron Co., Div. Frank Rieber, Inc., 11916 W. Pico Blvd., Los Angeles 34, Calif.—PRE

Cambridge Instrument Co., Inc., 3005 Grand Central Terminal, New York 17, N. Y.—H

Chicago Sound Systems, Inc., 2124 S. Michigan Ave., Chicago, Ill.—M, SS

Clark Radio Equipment Corp., 4313 N. Lincoln Ave., Chicago 18, Ill.—M, PRE, SS

Cline Electric Mfg. Co., 4550 W. Lexington Ave., Chicago, Ill.—PA, RC

Collins Radio Co., Cedar Rapids, Iowa—PA, PRE

Commercial Radio Sound Corp., 575 Lexington Ave., New York 22, N. Y.—B, E, H, I, M, PA, PRE, RC, SS, CR

Commercial Research Laboratories, Inc., 20 Bartlett Ave., Detroit 3, Mich.—PRE

Communicating Systems, Inc., 201-209 E. 18th St., New York 3, N. Y.—I, PA, PRE, SS

Communication Equipment & Engineering Co., 5646 W. Race St., Chicago 44, Ill.—PA, SS

Communications Co., Inc., 300 Greco Ave., Coral Gables 34, Fla.—M, PA, PRE, RC

Concord Radio Corp., 901 W. Jackson Blvd., Chicago 7, Ill.—H, I, M, PA, PRE, SS

Connecticut Telephone & Electric, Div. Great American Industries, Inc., Meriden 3, Conn.—B, I

Convers-O-Call—National Inter-Communicating Systems

Cover Dual Signal Systems, Inc., Div. Electra-Voice Corp., 5215 N. Ravenswood Ave., Chicago 40, Ill.—RC

Dalmo Victor, Div. Goldfield Consolidated Mines Co., 1414 El Camino Real, San Carlos, Calif.—I, RC, SS

Dayton Acme Co., 930 York St., Cincinnati 14, Ohio—I

DeVry Corp., 1111 Armitage Ave., Chicago, Ill.—SS

Dilks, Inc., 520 West Ave., Norwalk, Conn.—PA, SS

Drake Co., R. L., 11 Longworth St., Dayton 2, Ohio—SS

Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—H, I, M, PA, PRE, RC, SS

Eckstein Radio & Television Co., 914-918 La Salle Ave., Minneapolis 2, Minn.—M, PA

Electro Products Laboratories, 549 W. Randolph St., Chicago 6, Ill.—RC

Electronic Apparatus, Inc., 347 Madison Ave., New York 17, N. Y.—I, M, PA, PRE, SS

Electronic Engineering Service & Laboratories, 114-38 Farmers Blvd., St. Albans 12, N. Y.—PA, PRE, SS

Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—E, RC

Electronic Mfg. Co., 339-347 W. Eighth Ave., Dubuque, Iowa—I, SS

Electronic Measurements Co., Red Bank, N. J.—PA, PRE

Electronic Sound Engineering Co., 109 N. Dearborn St., Chicago 2, Ill.—CC, E, H, I, PA, SS

Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—I, M, PA, PRE, SS

Erwood Co., 223 W. Erie St., Chicago 10, Ill.—E, I, M, PA, PRE, RC, SS, CR

Executone, Inc., 415 Lexington Ave., New York 17, N. Y.—I, SS, E, I, PA

Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—PRE

Faraday Electric Corp., Adrian, Mich.—B

Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—I, PRE

Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20, N. Y.—"Ferranti"—M, PA, PRE

Flashtron—Thordarson Electric Mfg. Div.

Freed Transformer Co., 72 Spring St., New York 12, N. Y.—PA, PRE

Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—E, I, M, PA, PRE, SS

Gates Radio Co., 220 Hampshire St., Quincy, Ill.—PA, PRE, RC, SS

Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—I, PA, PRE, SS

General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—I

General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—I, M, PA, PRE, SS

Gentleman Products, Div. Henney Motor Co., 1702 Cuming St., Omaha, Nebr.—H, I, M, PA, PRE, RC, SS

Gibson, Inc., 225 Parson St., Kalamazoo 13F, Mich.—E

Globe Phone Mfg. Corp., 2 Linden St., Reading, Mass.—AM, B, H, PA, SS

Godfrey Mfg. Co., 171 S. 2nd St., Milwaukee 4, Wis.—I, PA, PRE, SS

Goodall Electric Mfg. Co., Third & Main Sts., Ogallala, Nebr.—SS

Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—H, I, M, PA, PRE, SS

Guided Radio Corp., 161 Sixth Ave., New York 13, N. Y.—SS

Hallicrafters Co., 2611 S. Indiana Ave., Chicago 16, Ill.—M

Hammond Instrument Co., 2915 N. Western Ave., Chicago 18, Ill.—E

Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—M, PA, PRE, RC, SS

Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—M, PA, PRE

Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—E, M, PA, PRE, SS

Higgins Industries, Inc., 2221 Warwick Ave., Santa Monica, Calif.—M, PA, PRE, RC, SS

Hoffmann Corp., C. L., 436 Boulevard of the Allies, Pittsburgh, Pa.—H

Holland Sound Engineering, 3730 Division St., Chicago, Ill.—AM, E, I, M, PA, PRE, RC, SS

Holtzer-Cabot, Div. First Industrial Corp., 125 Amory St., Roxbury 19, Mass.—SS

Huber Radio Co., 260 S. Center St., Casper, Wyo.—CC

Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—M, PA, PRE, RC, SS

Industrial Transformer Corp., 2540 Belmont Ave., New York 58, N. Y.—PA, PRE, SS

Instrument Elecronics, 253-21 Northern Blvd., Little Neck, L. I., N. Y.—PRE

Intercall Systems, Inc., 201 Hickory St., Dayton, Ohio—I

Intex Co., 303 W. 42nd St., New York 18, N. Y.—PA, SS

Kegron Mfg. Co., Inc., 18 W. 20th St., New York 11, N. Y.—B, I, PA

Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—B, I

Kinetic Electronics Corp., 235 E. 42nd St., New York 17, N. Y.—PA, SS

Kirkland Co., H. R., 8-10 King St., Morristown, N. J.—I

Kluge Electronics Co., 1031 N. Alvarado St., Los Angeles 26, Calif.—CC

Lake Mfg. Co., 2323 Chestnut St., Oakland 7, Calif.—"Voycall"—B, I

Langevin Co., Inc., 37 W. 65th St., New York 23, N. Y.—M, PA, PRE, RC, SS

Laurehk Radio Mfg. Co., 3931 Monroe Ave., Wayne, Mich.—"Laurehk"—H, PA

Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—PA, PRE

Lektra Labs., Inc., 30 E. 10th St., New York 3, N. Y.—E, I

Lenkurt Electric Co., 1138 Howard St., San Francisco 3, Calif.—CC

Lincoln Electronics Corp., 653 11th Ave., New York, N. Y.—E, H, I, PA, PRE, SS

Lincrophone Co., Inc., 1661 Howard Ave., Utica 3, N. Y.—SS

Logan Co., Les., 530 Gough St., San Francisco 2, Calif.—"Speed-X"—B

Loge Sound Engineers, J. M., 986 S. Western Ave., Los Angeles 6, Calif.—I, M, PA, PRE, RC, SS

Long Co., L. J., 186 Grand St., New York 13, N. Y.—I

Lyman Electronic Corp., 12 Cass St., Springfield, Mass.—PA, PRE

Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—PA

Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—M, PA, PRE

Maico Co., Inc., 21 N. Third St., Minneapolis 1, Minn.—E, H, I, M, PRE, SS

Marshall Radio Engineering Laboratories, 5008 Lankershin Blvd., North Hollywood, Calif.—SS

Meck Industries, Inc., John, Liberty at Pennsylvania, Plymouth, Ind.—"Audiograph"—SS

Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—E, I, M, PA, PRE, SS

Miessner Inventions, Inc., Van Beuren Rd., Morristown, N. J.—E

Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—"Miles"—I, M, PA, PRE, RC, SS

Milprint, Inc., 431 W. Florida St., Milwaukee 1, Wis.—AM

Mohawk Electric Mfg. Co., 60-62 Howard St., Irvington 6, N. J.—B

Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—I, M, PA, PRE, RC

Myers & Sons, E. A., 306 Beverly Rd., Pittsburgh 16, Pa.—"Radioear"—H

National Co., Inc., 61 Sherman St., Malden 48, Mass.—PA

National Inter-Communicating Systems, 1531 Devon Ave., Chicago 26, Ill.—"Convers-O-Call"—I, PA, PRE, SS

Newcomb Audio Products Co., 2815 S. Hill St., Los Angeles 7, Calif.—E, I, M, PA, PRE, RC, SS

North Electric Mfg. Co., Box 417, Galion, Ohio—I

Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—M, PA, PRE, SS

Ocram Corp., Auburn Rd., Seneca Falls, N. Y.—"Ocram"—B

Operadio Mfg. Co., St. Charles, Ill.—"Operadio"—B E, I, M, PA, PRE, RC, SS, CR

Otarion, Inc., 25 E. Washington St., Chicago, Ill.—H

Pacific Sound Equipment Co., 130 N. Beaudry Ave., Los Angeles 12, Calif.—SS

Paraloy Co., 600 S. Michigan Ave., Chicago 5, Ill.—SS

Polytron Corp., 401 Broadway, New York 13, N. Y.—I, PA, PRE

Powers Electronic & Communication Co., New St., Glen Cove N. Y.—EM, I, M, PA, PRE, SS

Presto Electric Co., 4511 New York Ave., Union City, N. J.—B, I

Racon Electric Co., Inc., 52 E. 19th St., New York 3, N. Y.—AM, I

Radiad Service, 720 W. Schubert Ave., Chicago 14, Ill.—SS

Radioear—E. A. Myers & Sons

Radio Frequency Laboratories, Inc., Boonton, N. J.—I

Radio Laboratories, Inc., 2701 California Ave., Seattle 6, Wash.—I, M, PA, SS, CR

Rauland Corp., 4245 N. Knox Ave., Chicago 41, Ill.—I, M, PA, PRE, SS

Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—I

RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—AM, E, H, I, M, PA, PRE, RC, SS, CR

Record-O-Vox, Inc., 721 N. Martel Ave., Hollywood 46, Calif.—PA, SS

Regal Electronics Corp., 20 W. 20th St., New York 11, N. Y.—I

Rehtron Corp., 4313 Lincoln Ave., Chicago 18, Ill.—M, PA, PRE, SS

Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—"Remler"—I, SS, M

Riggs & Jeffreys, Inc., 73 Winthrop St., Newark 4, N. J.—H, PA, PRE, SS

Robinson-Houchin Optical Co., 79 Thurman Ave., Columbus 6, Ohio—E, H

Ruby Electric Co., 729 Seventh Ave., New York, N. Y.—I, PA, SS

Saxl Instrument Co., 38-40 James St., East Providence 14, R. I.—H

Schulmerich Electronics, Inc., 220-228 No. Main St., Sellersville, Pa.—E, H, PA, PRE, SS

Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—CC

Selectrograph Mfg. Co., 502 W. Colo. Ave., Colorado Springs, Colo.—I

Select-O-Phone Co., Div. Screw Machine Products Co., Inc., 1012 Eddy St., Providence 5, R. I.—I

Setchell Carlson, Inc., 2233 University Ave., St. Paul 4, Minn.—"Setchell-Carlson"—M, PA, SS

Signal Engineering & Mfg. Co., 154 W. 14th St., New York 11, N. Y.—B, SS

Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—PA

Simpson Mfg. Co., Mark, 188 W. 4th St., New York 14, N. Y.—E, I, M, PA, PRE, RC, SS

Sonotone Corp., Saw Mill River Rd., Elmsford, N. Y.—H

S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N. Y.—PA, PRE, SS

Speed-X—Les Logan Co.

Standard Electric Time Co., 89 Logan St., Springfield 2, Mass.—B

Standard Transformer Corp., 1500 N. Halsted St., Chicago 22, Ill.—H, PA

Stephens Mfg. Co., 10416 National Blvd., Los Angeles 34, Calif.—"Trusonic"—PA, PRE, SS

Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—"Stromberg-Carlson"—I, PA, PRE, SS, CR

Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—PA, PRE

Talk-A-Phone Mfg. Co., 1512 S. Pulaski Rd., Chicago 23, Ill.—I

Task Electronics Co., 245 W. 54th St., New York, N. Y.—E, I, M, SS

TelAutograph Corp., 16 W. 61st St., New York 23, N. Y.—I

Telemotor Corp., 260 5th Ave., New York, N. Y.—I

Telex Products Co., Minneapolis, Minn.—H, I

Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—"Tru-Fidelity," "Flashtron"—PA, PRE

Transmitter Equipment Mfg. Co., Inc., 345 Hudson St., New York 14, N. Y.—PA, PRE, RC, SS

Trimm, Inc., 1770 W. Berteau Ave., Chicago 13, Ill.—H

Triumph Mfg. Co., 913 W. Van Buren St., Chicago 7, Ill.—I, PA, PRE

Tru-Fidelity—Thordarson Electric Mfg. Div.

Trusonic—Stephens Mfg. Co.

Turner Co., 909 17th St., N. E., Cedar Rapids, Iowa—E

U. S. Television Mfg. Corp., 106 Seventh Ave., New York 11, N. Y.—I, PRE

Vac-O-Grip Co, 2025 Detroit Ave., Toledo 6, Ohio—CR

Vacolite Co., 3001-3 N. Henderson, Dallas, Tex.—H

Vibraloc Mfg. Co., 325 Miguel St., San Francisco, Calif.—I, PA, PRE, SS

Walsh Engineering Co., 34 De Hart Pl., Elizabeth 2, N. J.—PA

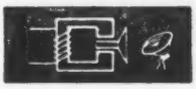
Waterman Products Co., Inc., 2445-63 Emerald St., Philadelphia 25, Pa.—PA

Watterson Radio Mfg. Co., 2700 Swiss Ave., Dallas 1, Tex.—I, PA, SS

Webster Electric Co., 1900 Clark St., Racine, Wis.—I, M, PA, PRE, SS

Wellman Mfg. Co., 7122 Melrose Ave., Los Angeles 46, Calif.—M, PA, PRE, SS
Western Electric Co., 195 Broadway, New York 7, N. Y.—H, SS
Western Sound & Electric Laboratories, Inc., 3512 W. St. Paul Ave., Milwaukee, Wis.—E, I, M, PA, PRE, RC, SS
Westinghouse Elec. Corp., East Pittsburgh, Pa.—I, M, PA, PRE, RC
Worner Electronic Devices, 609 W. Lake St., Chicago 6, Ill.—I
Wurlitzer Co., Rudolph, Falls Blvd., North Tonawanda, N. Y.—E
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—PA, SS
Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.—H

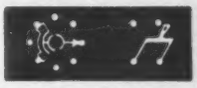
(36) Speakers & Headphones



Acoustic chambers ..... **CH**
Baffles ..... **B**
Cones ..... **C**
Crystal headphones ..... **HC**
Crystal speakers ..... **CS**
Dynamic headphones ..... **HD**
Electro-dynamic speakers ..... **D**
Field coils ..... **F**
Field exciters ..... **FE**
Grille cloths ..... **GC**
Hearing aid headphones ..... **HA**
Magnetic speakers ..... **M**
Magnetic headphones ..... **HM**
PM drivers ..... **PD**
PM dynamic speakers ..... **PM**
Projector horns ..... **PH**
Shims, adjusting ..... **S**
Stands ..... **ST**

Acme Wire Co., New Haven 14, Conn.—F
Aireon Mfg. Corp., Fairfax & Funston Rds., Kansas City 15, Kans.—CH, B, C, D, PM, PH
Altec Lansing Corp., 1161 N. Vine St., Hollywood 28, Calif.—CH, D, M, PH
American Communications Corp., 306 Broadway, New York, N. Y.—CH, B, FE
American Earphone Co., 10 E. 43rd St., New York 17, N. Y.—HA
Astatic Corp., Harbor & Jackson, Conneaut, Ohio—HC, HA
Atlas Sound Corp., 1443 39th St., Brooklyn 18, N. Y.—CH, B, C, D, FE, GC, PD, PH, ST, PM
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—CH
Aurex Corp., 1117 N. Franklin St., Chicago, Ill.—HC, HD, HM
Aviometer Corp., 370 W. 35th St., New York 1, N. Y.—HD, HM
Bell Sound Systems, Inc., 1183 Essex Ave., Columbus 3, Ohio—B, ST
Best Mfg. Co., Inc., 1200 Grove St., Irvington 11, N. J.—D, F, M
Bittermann Electric Co., 50 Henry St., Brooklyn 2, N. Y.—F
Bogen Co., Inc., David, 663 Broadway, New York 12, N. Y.—B
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—HC, CS, HA
Cannon Co., C. F., Springwater, N. Y.—HM
Carron Mfg. Co., 415 S. Aberdeen St., Chicago 7, Ill.—C, F, GC, S
Castlewood Mfg. Co., 12th & Burnett Sts., Louisville, Ky.—B, PH
Cellusuede Products, Inc., 500 N. Madison St., Rockford, Ill.—GC
Cinaudagraph Corp., 2 Selleck St., Stamford, Conn.—D, PM, PH
Cinaudagraph Speakers, Inc., 3911 S. Michigan Ave., Chicago, Ill.—D, M, PM
Clark Radio Equipment Corp., 4313 N. Lincoln Ave., Chicago 18, Ill.—CH
Commercial Radio Sound Corp., 575 Lexington Ave., New York 22, N. Y.—B, M, PH
Connecticut Telephone & Electric, Div. Great American Industries, Inc., Meriden 3, Conn.—HM
Consolidated Radio Products Co., 350 W. Erie St., Chicago 10, Ill.—D, HM, PM
Contract Specialties Co., 1743 Labrosse St., Detroit 16, Mich.—GC
Crescent Industries, Inc., 4140 Belmont Ave., Chicago 41, Ill.—D, PM
Dazor Mfg. Co., 4483 Duncan Ave., St. Louis 10, Mo.—ST
D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—D, F, PM
Electro Products Laboratories, 549 W. Randolph St., Chicago 6, Ill.—FE
Erwood Co., 223 W. Erie St., Chicago 10, Ill.—D, FE, HA, PD, PM, PH, ST
Fairfield Lumber Co., 1700 Post Rd., Fairfield, Conn.—B
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—HM, PM
Flock Process Co., Velvetone Div., 3 Quincy St., Norwalk, Conn.—GC
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7, Ill.—PD, PH
G-C—General Cement Mfg. Co.
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—"G-C"—GC, S
General Electric Co., Receiver Div., 1285 Boston Ave., Bridgeport 2, Conn.—PM
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—GC
General Instrument Corp., 829 Newark Ave., Elizabeth 3, N. J.—D, PM
Gentleman Products, Div. Henney Motor Co., 1702 Cuming St., Omaha, Nebr.—CH, B
Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—M, PH
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—HM, PD, PM, PH
Guided Radio Corp., 161 Sixth Ave., New York 13, N. Y.—PM
Hallicrafters Co., 2611 S. Indiana Ave., Chicago 16, Ill.—PM
Hawley Products Co., 333-339 N. 6th St., St. Charles, Ill.—CH, B, C, PH
Illinois Wood Products Corp., 2512 S. Damen Ave., Chicago 8, Ill.—B
Industrial Fabricators, Inc., 1890 Carter Rd., Cleveland 13, Ohio—B
Industrial Transformer Corp., 2540 Belmont Ave., New York 58, N. Y.—F
Jensen Radio Mfg. Co., 6601 S. Laramie Ave., Chicago 38, Ill—CH, B, C, D, F, FE, PD, PM, PH, ST
J. F. D. Mfg. Co., 4111 Ft. Hamilton Parkway, Brooklyn 19, N. Y.—F
Langevin Co., Inc., 37 W. 65th St., New York 23, N. Y.—CH, PH
Magnavox Co., Ft. Wayne 4, Ind.—D, F, PD, PM
Maico Co., Inc., 21 N. Third St., Minneapolis 1, Minn.—HD, D, HA, HM
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—CH
Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.—CH, B, PH
Murdock Co., Wm. J., 158 Carter St., Chelsea 50, Mass.—HM
National Co., Inc., 61 Sherman St., Malden 48, Mass.—CH, B
National Molding Co., 2141 W. Washington Blvd., Los Angeles 7, Calif.—C
Newcomb Audio Products Co., 2815 S. Hill St., Los Angeles 7, Calif.—B, PD, PM, PH
Olek & Son, Inc., A., 4757-59 Melrose St., Philadelphia 37, Pa.—GC
Operadio Mfg. Co., St. Charles, Ill.—CH, B, C, HD, D, F, PD, PM, PH
Oxford-Tartak Radio Corp., 3911 S. Michigan Ave., Chicago, Ill.—B, C, D, F, FE, HF, M, PD, PH, PM
Perfection Electric Co., 829 S. State St., Chicago 5, Ill.—D
Permoflux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—HD, D, M, HM, PM
Powers Electronic & Communication Co., New St., Glen Cove, N. Y.—PH
Quadriga Mfg. Co., 213 W. Grand Ave., Chicago 10, Ill.—S
Quam-Nichols Co., 33rd Place & Cottage Grove Ave., Chicago 16, Ill.—D, PM
Racon Electric Co., Inc., 52 E. 19th St., New York 3, N. Y.—CH, B, C, D, M, PD, PM, PH, ST
Radell Corp., 215 W. Michigan St., Indianapolis 2, Ind.—D, PM
Radio Speakers, Inc., 221 E. Cullerton St., Chicago, Ill.—HD, HM, D, PM
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden N. J.— C, F, PD, PM
Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—B, HD
Robinson-Houchin Optical Co., 79 Thurman Ave., Columbus 6, Ohio—CH, HA, HM
Rola Co., Inc., 2530 Superior Ave., Cleveland 14, Ohio—D, FE, PM
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"Walsco"—GC, S
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—D, PM
Shure Bros., 225 W. Huron St., Chicago 10, Ill.—HA, HM
Simpson Mfg. Co., Mark, 188 W. 4th St., New York 14, N. Y.—CH, B, PM, PH, ST
Smith Mfg. Co., Nathan R., 105 Pasadena Ave., South Pasadena, Calif.—F
Sonotone Corp., Saw Mill River Rd., Elmsford, N. Y.—HA, HM
S. O. S. Cinema Supply Corp., 449 W. 42nd St., New York 18, N. Y.—CH, B, FE
South Shore Radio & Electric Corp., 6815 Stony Island Ave., Chicago 49, Ill.—D
Stephens Mfg. Co., 10416 National Blvd., Los Angeles 34, Calif.—CH, B, D, F, PD, PM,PH
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—CH, B, C, PD, PM, PH
Telex Products Co., Minneapolis, Minn.—HA, HM
Trimm, Inc., 1770 W. Berteau Ave., Chicago 13, Ill. HD, HA, HM
University Laboratories, 225 Varick St., New York 14, N. Y.—CH, B, D, PD, PM, PH, ST
Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—CH, B, D, PD, PM, PH
Vibraloc Mfg. Co., 325 Miguel St., San Francisco, Calif.—CH, B
Walsco—Walter L. Schott Co.
Watterson Radio Mfg. Co., 2700 Swiss Ave., Dallas 1, Tex.—B
Welsh Co., Wm. H., 2241 S. Indiana Ave., Chicago 16, Ill.—C
Western Sound & Electric Laboratories, Inc., 3512 W. St. Paul Ave., Milwaukee, Wis.—B, S
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—CH, B

(37) Switches & Relays



Capacitance relays ..... **CR**
Circuit breakers ..... **CB**
Counters, electric ..... **C**
Differential relays ..... **DR**
Float switch ..... **F**
Fluorescent lamp starters ..... **FS**
Key switch ..... **SK**
Mercury relays ..... **M**
Mercury switches ..... **MS**
Polarized relays ..... **RP**
Pressure switch ..... **PS**
Push button ..... **PB**
Relays ..... **R**
Rotary selector switches ..... **SL**
Safety interlocks ..... **S**
Slide switches ..... **SS**
Solenoids ..... **SO**
Stepping relays ..... **SR**
Thermal switches ..... **T**
Time delay relays ..... **TD**
Timers ..... **TE**
Toggle switches ..... **TO**
Vacuum switches ..... **V**
Wave change (receiver) ..... **W**
Wave change (transmitter) ..... **WT**

Acme Fire Alarm Co., Inc., 106 7th Ave., New York 11, N. Y.—R
Acro Electric Co., 1305 Superior Ave., Cleveland 14, Ohio—"Acrosnap"—PB, TO
Acrosnap—Acro Electric Co.
Adams & Westlake Co., N. Michigan, Elkhart, Ind.—M, MS, R, TD
Advance Electric & Relay Co., 1260 W. 2nd St., Los Angeles 26, Calif.—R, TD
Air Communications, Inc., 2233 Grand Ave., Kansas City, Mo.—PS
Aireon Mfg. Corp., Fairfax & Funston Rds., Kansas City 15, Kans.—CB
Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis.—F, PS, PB, R, SO, TD, TE, V
Allied Control Co., Inc., 2 East End Ave., New York 21, N. Y.—R, RP, SO, SR, TD, TE
Allis-Chalmers Mfg. Co., P. O. Box 512, Milwaukee 1, Wis.—R, SL
American Coil & Engineering Co., 1271 N. Hermitage Ave., Chicago 22, Ill.—R, SO
American Electronics Co., 216 Centre St., New York 13 N. Y.—SK, PB, R, T, TO
American Gas Accumulator Co., 1027 Newark Ave., Elizabeth 3, N. J.—TD
American Instrument Co., 8030 Georgia Ave., Silver Spring, Md.—R
American Television & Radio Co., 300 E. Fourth St., St. Paul 1, Minn.—SO
American Time Products, Inc., 580 Fifth Ave., New York 19, N. Y.—TE
American Type Founders, 11 W. 42nd St., New York, —TE
Amperite Co., 561 Broadway, New York, N. Y.—R, T, TE
Ansonia Clock Co., Inc., 103 Lafayette St., New York 13, N. Y.—TE
Aray Mfg. & Supply Co., 3107 Pine St., St. Louis 3, Mo.—CR, R
Arkay Laboratories, Inc., 1570 S. First St., Milwaukee 4, Wis.—TD
Ark-Les Switch Corp., 51 Water St., Watertown 72, Mass.—SL
Arrow-Hart & Hegeman Elec. Co., 103 Hawthorn St., Hartford 6, Conn.—F, FS, PB, R, SL, T, TO
Austin Co., M. B., 108-116 S. Desplaines St., Chicago 6, Ill.—TE
Auth Electrical Specialty Co., Inc., 422 E. 53rd St., New York 22, N. Y.—C, R, SR, TE, DR, TD
Autocall Co., 1142 Tucker Ave., Shelby, Ohio—R, RP, SR, MS, TD
Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.—C, SK, M, RP, PB, R, SO, SR, TD, TO
Automatic Electric Mfg. Co., 10 State St., Mankato 1, Minn.—"Automatic"—RP, R, SO, TD, TE
Automatic Switch Co., 41 E. 11th St., New York 3, N. Y.—R, SO

Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44, Pa.—R, TD, TE
Aviometer Corp., 370 W. 35th St., New York 1, N. Y. —PB
Bacon Electric Timer Corp., 4513 Brooklyn Ave., Cleveland 9, Ohio—TE
Bank's Mfg. Co., 1105 W. Lawrence Ave., Chicago 40, Ill.—R
Barber-Colman Co., River & Loomis Sts., Rockford, Ill. R, RP, TE
Barker & Williamson, Upper Darby, Pa.—SL, WT
Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, North Hollywood, Calif.—V
Benwood-Linze Co., 1815 Locust St., St. Louis 3, Mo.—SL
Betts & Betts Corp., 551 W. 52nd St., New York 19, N. Y.—R, T, TD, TE
Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—SL
Birtcher Corp., 5087 Huntington Dr., Los Angeles 32, Calif.—R
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N. Y.—PB, TO
Bristol Co., Waterbury 91, Conn.—TO
Brown Engineering Co., 4635 S.E. Hawthorne Blvd., Portland 15, Ore.—SL
Browne Electric Co., J., 3774 Surf Ave., Brooklyn 24, N. Y.—CB, FS, R, T, TD
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—CR
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—TE
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—R
Burlington Instrument Corp., 214 N. 4th St., Burlington, Iowa—R, TD
Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.—R, SO
Carter Radio Division, Precision Parts Co., 213 Institute Place, Chicago 10, Ill.—PB, SK
Centralab Div., Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.—SL, TO, W, WT
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—SL
Clare & Co., C. P., 612 N. Michigan Ave., Chicago 11, Ill.—SK, M, PB, R, SL, SR, TD
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio—F, PB, R, SL, TD
Cole-Hersee Co., 54 Old Colony Ave., Boston 27, Mass.—TE
Collins Radio Co., Cedar Rapids, Iowa—WT
Connecticut Tele. & Elec. Div. of Great American Industries, Inc., Meriden 3, Conn.—SK, RP, PB, SL, SR
Continental X-Ray Corp., 1536 N. Clybourne, Chicago, Ill.—SL
Control Corp., 718 Central Ave., Minneapolis 14, Minn.—R, TE
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—PS, R, SO, T, TD, TO, V
Cover Dual Signal Systems, Inc., Div. of Electra Voice Corp., 5215-25 Ravenswood Ave., Chicago 40, Ill.—SR, SL, TD
Cramer Co., Inc., R. W., Centerbrook, Conn.—TD, TE
Curtis Development & Mfg. Co., 3266 N. 33rd St., Milwaukee 10, Wis.—T, TD
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.—CB, C, F, PS, PB, R, SL, S, SO, T, TD, TE, TO, V
Cyclotron Specialties Co., Moraga, Calif.—TE
Daven Co., 191 Central Ave., Newark 4, N. J.—SL
Dayton Acme Co., 930 York St., Cincinnati 14, Ohio —T, TD
Diamond H—Hart Mfg. Co.
Dietz Mfg. Co., 2310 S. La Cienega Blvd., Los Angeles 34, Calif.—T, V
Distillation Products, Inc., Vacuum Equipment Div., 755 Ridge Road West, Rochester 13, N. Y.—R, V
Doehler-Jarvis Corp., Robertson St., Batavia, N. Y.—CB, SK, PB
Dual Remote Control Co., 31776 Cowan Road, Wayne, Mich.—R
Durakool, Inc., 1010 N. Main St., Elkhart, Ind. —M, MS
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza S., Long Island City 1, N. Y.—PB
Eagle Signal Corp., 202 20th St., Moline, Ill.—PB, R, SR, TD, TE
Eastern Air Devices, Inc., 585 Dean St., Brooklyn 17, N. Y.—SO
Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—SL, W
Ecco High Frequency Corp., 7020 Hudson Blvd., North Bergen, N. J.—SL
Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.—PS, R
Eimac—Eitel-McCullough, Inc.
Eitel-McCullough, Inc., San Bruno, Calif.—"Eimac"—V
Electric Auto Lite Co., Port Huron, Mich.—R
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, Ohio—F, PS, PB, R, TD, TE
Electric Switch Corp., 14th at Union St., Columbus, Ind.—TE
Electrical Products Supply Co., 1140 Venice Blvd., Los Angeles 15, Calif.—R, TD
Electrical Windings, Inc., 2015 N. Kolmar Ave., Chicago 39, Ill.—SO
Electricoil Transformer Co., 421 Canal St., New York 13, N. Y.—SO
Electronic Control Corp., 1573 E. Forest St., Detroit, Mich.—TE
Electronic Measurements Co., Red Bank, N. J.—TE
Electronic Products Co., 19 N. First St., Geneva, Ill.—TE
Electronic Sound Engineering Co., 109 N. Dearborn St., Chicago 2, Ill.—TE
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—R, SL, SO, T, TD, TE
Engineering Laboratories, Inc., 610-624 E. 4th St., Tulsa 3, Okla.—RP, R, TD, TE
Espey Mfg. Corp., 528 E. 72nd St., New York 21, N. Y.—SL, TD
Faraday Electric Corp., Adrian, Mich.—R
Federal Anti-Capacity Switch Corp., 1200 Niagara St., Buffalo 13, N. Y.—SK
Federal Electric Co., 8700 S. State St., Chicago, Ill. —CB, FS
Federal Instrument Co., 3917 47th Ave., Long Island City, N. Y.—R
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—C, SK, R, SL, SR, TD
Fenwal, Inc., Ashland, Mass.—T
Foxboro Co., Foxboro, Mass.—TE
Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago, Ill.—TE
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—PS, PB, TO
General Control Co., 1200 Soldiers Field Road, Boston 34, Mass.—C, SK, MS, PB, SL, TD, TE, W, WT
General Controls Co., 801 Allen Ave., Glendale, Calif.—R
General Electric Co., 1285 Boston Ave., Bridgeport 2, Conn.—FS, SK, MS, PB, SL, T, TO
General Electric Co., Specialty Div., 1001 Wolf St., Syracuse, N. Y.—SL, S
General Electric Co., Tube Div., 1 River Rd., Schenectady 5, N. Y.—V, TE, R, RP, TD
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago, Ill.—TE
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—"G-R," "Variac"—SL
General Time Instruments Corp., Seth Thomas Clocks Div., Thomaston, Conn.—TE
Geophysical Instrument Co., 1820 N. Nash St., Arlington, Va.—R
Gibbs & Co., Thomas B., Div. of George W. Borg Corp., 814 Michigan St., Delavan, Wis.—"Gibbs"—TD
Gilbert Clock Co, Wm. M., Winsted, Conn.—TE
G-M Laboratories, Inc., 4300 N. Knox Ave., Chicago 41, Ill.—R, TD
Goodall Electric Mfg. Co., 3rd & Main Sts., Ogalalla, Neb.—FS
Gorrell & Gorrell, Haworth, N. J.—TE
G-R—General Radio Co.
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—V
Grayhill, 1 N. Pulaski Rd., Chicago 24, Ill.—PB, R
Gregory Mfg. Co., 67 Franklin St., New Haven 11, Conn.—PS
Guardian Electric Mfg. Co., 1400 W. Washington Blvd., Chicago 7, Ill.—C, M, R, S, SO, SR, TD, TE
Hart Mfg. Co., Hamilton St., Hartford 1, Conn.—"Diamond H"—M, R, TO
Hartman Electrical Mfg. Co., 175 N. Diamond St., Mansfield, Ohio—RP, PB, R, T
Haydon Mfg. Co., Inc., Forestville, Conn.—TD, TE
H-B Instrument Co., 2524 N. Broad St., Philadelphia 32, Pa.—T
Heinemann Circuit Breaker Co., Trenton 2, N. J.—CB
Heinze Electric Co., Lowell, Mass.—R
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—PS, SO, TE
Hetherington & Son, Inc., Robert, 1216 Elmwood Ave., Sharon Hill, Pa.—PB, SO, T
Holtzer Cabot Signal Div., 400 Stuart St., Boston 17, Mass.—R, TD
Industrial & Commercial Electronics, Belmont, Calif.—V
Industrial Electronics Corp., 80 Bank St., Newark, N. J.—CB, FS
Industrial Engineering Corp., Rea Bldg., Terre Haute, Ind.—TE
Industrial Timer Corp., 115 Edison Place, Newark 5, N. J.—C, TD, TE
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—PB, TO
International Register Co., 2620 W. Washington Blvd., Chicago 12, Ill.—TD, TE
I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.—CB
J-B-T Instruments, Inc., 441 Chapel St., New Haven 8, Conn.—SL
Jefferson Electric Co., 25th Ave. & Madison St., Bellwood, Ill.—SO
Jennings Radio Mfg. Co., McLaughlin Rd., San Jose 12, Calif.—R
J.F.D. Mfg. Co., 4111 Ft. Hamilton Pkwy., Brooklyn 19, N. Y.—SL, TO
Johnson Co., E. F., Waseca, Minn.—R
Keeney & Co., Inc., J. H., 6610 S. Ashland Ave., Chicago 36, Ill.—PB, R, SO, SR, TD, TE
Kegron Mfg. Co., Inc., 18 W. 20th St., New York 11, N. Y.—PS
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—CB, SK, M, RP, PB, R, T, TD
Kirkland Co., H. R., 8-10 King St., Morristown, N. J. —PB
Kolton Electric Mfg. Co., 123 New Jersey Railroad Ave., Newark 5, N. J.—CB
Kulka Electric Mfg. Co., Inc., 30 South St., Mt. Vernon, N. Y.—TO
Kurman Electric Co., 35-18 37th St., Long Island City, N. Y.—R, TD
Lake Mfg. Co., 2323 Chestnut St., Oakland 7, Calif.—R
Leach Relay Co., 5915 Avalon Blvd., Los Angeles, Calif.—R, TD
Lear, Inc., Piqua, Ohio—SO
Leich Electric Co., 565 W. Washington Blvd., Chicago 6, Ill.—R
Lektra Labs., Inc., 30 E. 10th St., New York 3, N. Y. —TD, TE
Leupold & Stevens Instruments, 4445 N.E. Glisan St., Portland 13, Ore.—F
Lewis Electronics, Inc., Los Gatos, Calif.—R
Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn.—SL
Littelfuse, Inc., 4757 Ravenswood Ave., Chicago 40, Ill.—CB, MS, R
Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—C, F, TD, TE, R
Magnavox Co., Fort Wayne 4, Ind.—SO
Magnetic Gauge Co., 60 E. Bartges St., Akron, Ohio —TD
Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—TE
Maico Co., Inc., 25 N. Third St., Minneapolis, Minn. —R, SR
Mallory & Co., Inc., P. R., 3029 E. Washington St., Indianapolis 6, Ind.—PB, SL, TE
Mark Time—M. H. Rhodes, Inc.
Mattern Mfg. Co., F., 4647 N. Cicero Ave., Chicago 30, Ill.—SL
McDonnell & Miller, 400 N. Michigan Ave., Chicago, Ill.—F
Megard Corp., 1601 S. Burlington St., Los Angeles 6, Calif.—TD, TE
Meletron Corp., 950 N. Highland Ave., Los Angeles 38, Calif.—PS, SO, TD, V
Mendelsohn Speedgun Co., 457 Bloomfield Ave., Bloomfield, N. J.—TE
Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.—MS, PS, R
Meyers Safety Switch Co., Inc., 423 Tehama St., San Francisco 3, Calif.—SK
Michigan Fluorescent Light Co., 71-77 S. Parke St., Pontiac, Mich.—FS
Micro Switch Div. of First Industrial Corp., Freeport, Ill.—"Microswitch"—SK, PB, T
Miles Reproducer Co., Inc., 812 Broadway, New York, N. Y.—R
Minneapolis-Honeywell Reg. Co., 2753 Fourth Ave. S., Minneapolis, Minn.—R, TE
Mohawk Electric Mfg. Co., 60-62 Howard St., Irvington 6, N. J.—CB, F, R, SO, TD
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—SK, PB
Monitor Controller Co., 51 S. Gay St., Baltimore 2, Md.—F, PB, R, SL, TD, TE, V
Mossman, Inc., Donald P., 612 N. Michigan Ave., Chicago 11, Ill.—R, SK, PB, SL
Mu-Switch Corp., 110 Pequit St., Canton, Mass.—SK, PS, PB, S, T
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—"Muter"—PB, R
National Co., Inc., 61 Sherman St., Malden 48, Mass. —PB, W
National Research Corp., 100 Brookline Ave., Boston 15, Mass.—V
Naxon Utilities Corp., 2101-11 W. Walnut St., Chicago 12, Ill.—R
New England Radiocrafters, 1156 Comonwealth Ave., Boston 34, Mass —SL
New Haven Clock Co., New Haven 4, Conn.—TD
North Electric Mfg. Co., Box 417, Galion, Ohio—M, R, SL, SR, TD, TE
Northwestern Clock Co., 514-15 Brown Bldg., Omaha, Neb.—TE
Oak Mfg. Co., 1260 Clybourn Ave., Chicago 10, Ill.—"Oak"—PB, R, SL, SR, W
Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill.—SL
Paragon Electric Co., 37 W. Van Buren, Chicago 5, Ill.—R, TE, TD
Paramount Electric Mfg. Co., 419 Tehama St., San Francisco, Calif.—TO
Parker Engineering Products Co., 16 W. 22nd St., New York, N. Y.—R
Partlow Corp., 2 Campion Rd., New Hartford, N. Y.—TD, TE
Pass & Seymour, Inc., Syracuse 9, N. Y.—SK, MS, PB
Peerless Laboratories, 467 10th Ave., New York 18, N. Y.—SL
Philadelphia Thermometer Co., 6th & Cayuga Sts., Philadelphia, Pa.—R, M
Phillips Control Corp., 612 N. Michigan Ave., Chicago 11, Ill.—SO
Photoswitch, Inc., 77 Broadway, Cambridge, Mass.—TD, TE
Photovolt Corp., 95 Madison Ave., New York 16, N. Y. —TD, TE
Pierce Laboratory, Inc., Summit, N. J.—"Pierceway" —CB, R
Pierceway—Pierce Laboratory, Inc.
Plating Processes Corp., 109 Lyman St., Holyoke, Mass.—F
Portable Products Co., C. J. Tagliabue Div., 550 Park Ave., Brooklyn 5, N. Y.—TE
Potter & Brumfield Mfg. Co., Inc., 617 N. Gibson St., Princeton, Ind.—R, TD
Potter Instrument Co., 136-56 Roosevelt Ave., Flushing, L. I., N. Y—TE

Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia, Pa.—R, M, RP, TD
Premier Crystal Laboratories, Inc., 63 Park Row, New York 7, N. Y.—T, TE
Presto Electric Co., 4511 New York Ave., Union City, N. J.—SK, PB
Price Electric Corp., East Church and 2nd Sts., Frederick, Md.—RP, R, SL, SO, SR, TD
Radio Frequency Laboratories, Inc., Boonton, N. J.—C
Radionic Controls, 3758 Belmont Ave., Chicago 18, Ill. —R, SO
Rawson Electrical Instrument Co., Inc., 110 Potter St., Cambridge 42, Mass.—TE
R-B-M Mfg. Co., Div. of Essex Wire Corp., Hanna St., Logansport, Ind.—CB, RP, PB, R, SO, TD, TO
Rehtron Corp., 4313 Lincoln Ave., Chicago 18, Ill.—TD
Reliance Automatic Lighting Co., 1927 Mead St., Racine, Wis.—TD, TE
Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—SK, R
Reynolds Electric Co., 2650 W. Congress St., Chicago 12, Ill.—T, TD, TE
Rhodes, Inc., M. H., 1 Hudson St., Hartford, Conn.— "Mark Time"—TD, TE
Richardson-Allen Corp., 15 W. 20th St., New York, N. Y.—TD, TE, WT
Rogers Precision Products Co., 270 Lafayette St., New York 12, N. Y.—CB, FS
Roller-Smith Div., Realty & Industrial Corp., 1760 W. Market St., Bethlehem, Pa.—CB, R, SL
Rowe Radio Research Laboratory Co., 2422 N. Pulaski Rd., Chicago 39, Ill.—TE
Rubicon Co., Ridge Ave. at 35th St., Philadelphia 32, Pa.—SL
Sangamo Electric Co., Springfield, Ill.—TE
Schaar & Co., 754 W. Lexington St., Chicago 7, Ill. —TE
Self Winding Clock Co., 205 Willoughby Ave., Brooklyn 5, N. Y.—TE
Shallcross Mfg. Co., Jackson & Pusey Aves., Collingdale, Pa.—"Shallcross"—SL
Sheldon Electric Co. Inc., 76 Coit St., Irvington 11, N. J.—FS
Sigma Instruments, Inc., 70 Ceylon St., Boston 21, Mass.—RP, R, TD
Signal Electric Mfg. Co., 1939 Troam St., Menominee, Mich.—CB, RP, R, TE
Signal Engineering & Mfg. Co., 154 W. 14th St., New York 11, N. Y.—RP, PB, R, SR, TD, TE
Simonds Machine Co., Inc., 246-48 Worcester St., Southbridge, Mass—PS
Smith Mfg. Co., S. A., Union & Augusta, Rochester 2, N. Y.—CB
Smith Mfg. Co., Nathan R., 105 Paadena Ave., South Pasadena, Calif.—PS, R, SO
Sorenson & Co., 375 Fairfield Ave., Stamford, Conn.— CR, R, TD, TE
Special Electric Labs., 7657 S. Central Ave., Los Angeles 1, Calif.—TE
Spencer Thermostat Co., 34 Forest St., Attleboro, Mass. —CB, T, TD
Sperti, Inc., Beech & Kenilworth, Norwood Sta., Cincinnati 12, Ohio—M, V, SO
Square D Co., 6060 Rivard St., Detroit 11, Mich. —R, TD
Stackpole Carbon Co., P. O. Box 327, St. Marys, Pa. —PB, SL
Staco—Standard Electric Co.
Standard Electric Time Co., 89 Logan St., Springfield 2, Mass.—C, TE
Standard Electric Co., 400 Linden Ave., Dayton 3, Ohio —"Staco"—R, TD
Stoelting Co., C. H., 424 N. Homan Ave., Chicago, Ill.—TE
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—SK, R, SR TD
Struthers-Dunn, Inc., 1321 Arch St., Philadelphia 7, Pa.—M, MS, RP, R, SO, SR, TD, TE
Sundt Engineering Co., 4763 Ravenswood Ave., Chicago, Ill.—CB
Taller & Cooper, 75 Front St., Brooklyn 1, N. Y.— C, SK, SL, TE
Taylor Tubes, Inc., 2312 Wabansia Ave., Chicago 47, Ill.—V
Tech Laboratories, 337 Central Ave., Jersey City 7, N. J.—"Tech-Lab"—SL, SO, SR
Technical Products Co., 158 Madison Ave. at 3rd St., Memphis, Tenn.—R, TE
Telegraph Apparatus Co., 412 S. Green St., Chicago, Ill —SK
Teleoptic Co., 1251 Mound Ave., Racine, Wis.—TD, TE, TO
Teleregister Corp., 157 Chambers St., New York 7, N. Y.—C
Thermador Electric Mfg. Co., 5119 S. Riverside Drive, Los Angeles 22, Calif.—SO
Thompson Clock Co., H. C., 38 Federal St., Bristol, Conn.—TE
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—R
Thwing-Albert Instrument Co., Penn St., & Pulaski Ave., Philadelphia 44, Pa.—SL
Tork Clock Co., 1 Grove St., Mt. Vernon, N. Y.—R, TE
Triplett Electrical Instrument Co., Harmon Rd., Bluffton, Ohio—R, SL
Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.—CB, PB, T
Tung-Sol Lamp Works, Inc., 95 Eighth Ave., Newark 4, N. J.—T
Tungsten Contact Mfg. Co., 7311 Cottage Ave., North Bergen, N. J.—R, SK
Ulanet Co., George, 413 Market St., Newark 5, N. J.— T, TD, TE
Union Switch & Signal Co., Swissvale, Pa.—SR, RP, TD, TE
United Cinephone Corp., 65 New Litchfield St., Torrington, Conn.—R, TE
United Electric Controls Co., 71 A St., S. Boston 27, Mass.—PS, T
United Electronics Co., 42 Spring St., Newark 2, N. J. —V
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—R
Universal X-Ray Products, Inc., 1800 N. Francisco Ave., Chicago 47, Ill.—C, TE, V
Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—SK, PB, R, SL, TO
Variac—General Radio Co.
Veeder-Root, Inc., Hartford, Conn.—C
Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio—TD, V
Voker Corp., 7300 Huron River Dr., Dexter, Mich.— PB, SL, W
Wallace & Tiernan Products, Inc., Main & Mill Sts., Belleville 9, N. J.—R, TE
Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y.—M, PB, R, SO, T, TD, SR
Warren Telechron Co., Ashland, Mass.—C, TE
Wellman Mfg. Co., 7122 Melrose Ave., Los Angeles 46, Cal.f.—SO
Western Electric Co., Inc., 195 Broadway, New York 5, N. Y.—R
Western Electro-Mechanical Co., Inc., 300 Broadway, Oakland, Calif.—R
Westinghouse Electric Corp., East Pittsburgh, Pa. CB, FS, F, RP, R, PS, PB, SL, S, SO, T, TD, TE, TO, WT
Westinghouse Electric Corp., Meter Div., 95 Orange St., Newark 1, N. J.—R
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—R, TD
Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—SO
Williams Mfg. Co., 161 W. Huron St., Chicago 10, Ill. —R, SR
Wilson Mfg. Co., Inc., 600 N. Andrews Ave., Ft. Lauderdale, Fla.—TE
Wirt Co., 5221-27 Greene St., Philadelphia 14, Pa.— PB, SL, SS
World Wide Electronics, Inc., 72 E. 13th St., New York 3, N. Y.—SO
Worner Electronic Devices, 609 W. Lake St., Chicago 6, Ill.—TD

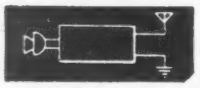
(38) Transformers & Chokes

Audio (receiving)	**A**
Auto transformers	**AU**
Bridge	**B**
Chokes	**C**
Coils & windings	**CW**
Current transformers	**T**
Deflection yokes	**DY**
Fence controllers	**FA**
Fluorescent reactors	**R**
Mike cable transformers	**MT**
Plug-in transformers	**PT**
Power, receiving-transmitting	**P**
Rotatable transformers	**RT**
Voltage regulating	**VR**
Welding transformers	**WT**

ACA—Amplifier Co. of America
Acme Electric & Mfg. Co., Cuba, N. Y.—"Acme"—A, AU, C, FA, R, P, RT, VR, WT
Acme Wire Co., New Haven 14, Conn.—CW
Advance Transformer Co., 1161 W. Madison St., Chicago 7, Ill.—C, VR
Aerolite Electronic Hardware Corp., 24 Cliff St., Jersey City 6, N. J.—CW
Agnew Electric Co., Milford, Mich.—WT
Airdesign, Inc., 241 Fairfield Ave., Upper Darby, Pa. —A, P, C
Airtronics Development Corp., 131-133 E. Third St., Dayton 2, Ohio—C, CW, T, P
Altec Lansing Corp., 1161 N. Vine St., Hollywood 28, Calif.—AU, C, P
American Coil & Engineering Co., 1271 N. Hermitage Ave., Chicago 22, Ill.—A, AU, C, CW, T, R, P
American Communications Corp., 306 Broadway, New York, N. Y.—C
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—AU, C, CW, P
American Transformer Co., Inc., 178 Emmet St., Newark 5, N. J.—"Amertran"—A, AU, B, C, CW, T, R, P, VR, WT, MT, RT
Amertran—American Transformer Co.
Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—"ACA"—A, AU, B, C, CW, T, P, VR
Associated Research, Inc., 231 S. Green St., Chicago 7, Ill.—T
Audio Development Co., 2833 13th Ave., South, Minneapolis 7, Minn.—AU, C
Auston Co., M. B., 108-116 S. Desplaines St., Chicago 6, Ill.—FA
Automatic Mfg. Corp., 900 Passaic Ave., East Newark, N. J.—AU, C, R, P
Benwood-Linze Co., 1815 Locust St., St. Louis 3, Mo. —A, C, T
Berger Electronics, 109-01 72nd Rd., Forest Hills, N. Y.—R
Best Mfg. Co., Inc., 1200 Grove St., Irvington 11, N. J.—A, AU, C, CW
Bittermann Electric Co., 50 Henry St., Brooklyn 2, N. Y.—AU, C, CW, T
Bogen Co., Inc., David, 663 Broadway, New York 12, N. Y.—A, C, P
Burnett Radio Laboratory, William W. L., 4814 Idaho St., San Diego 4, Calif.—AU, C
Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass.—A, AU, C, CW, T, P
Campbell X-Ray Corp., 2 Overland St., Boston 15, Mass.—AU, CW, T, P, WT
Chicago Transformer Division, Essex Wire Corp., 3501 Addison St., Chicago 18, Ill.—"Chitran"—A, AU, B, C, T, FA, R, P, VR, WT
Chitran—Chicago Transformer Div. Essex Wire Co.
Clifton Products, Inc., Blackbrook Rd., Painesville, Ohio—R
Cole Radio Works, 86 Westville Ave., Caldwell, N. J. —P
Communication Parts, 1101 N. Paulina St., Chicago 22, Ill.—A, B, C, CW
Condenser Products Co., 1375 N. Branch St., Chicago 22, Ill.—R
Connecticut Telephone & Electric, Div. Great American Industries, Inc., Meriden 3, Conn.—R
Control Corp., 718 Central Ave., Minneapolis 14, Minn.—A, C, CW, P
Coto-Coil Co., Inc., 65 Pavillion Ave., Providence 5, R. I.—CW
Curtis Development & Mfg. Co., 3260 N. 33rd St., Milwaukee 10, Wis.—CW, T, FA
Davis & Co., Inc., Dean W., 549 Fulton St., Chicago, Ill.—AU, C, CW
Dinion Coil Co., Inc., North St., Caledonia, N. Y.—A, AU, C, CW, R, P
Dongan Electric Mfg. Co., 2987 Franklin St., Detroit 7, Mich.—A, AU, B, C, CW, T, FA, R, PT, P
D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—C, CW, T, DY, R
Eastern Specialty Co., 3617 N. 8th St., Philadelphia 40, Pa.—T
Ecco High Frequency Corp., 7020 Hudson Blvd., North Bergen, N. J.—AU, C, P
Eisler Engineering Co., 750 S. 13th St., Newark 3, N. J.—C, CW, VR, WT
Elco—Electron Equipment Corp.
Electric Heat Control Co., 9123 Inman Ave., Cleveland 5, Ohio—CW, FA, WT
Electrical Equipment, Inc., 1622 Mass. Ave., Cambridge 38, Mass.—CW
Electrical Facilities, Inc., 4224 Holden St., Oakland 8, Calif.—T
Electrical Reactance Corp., 49 Elm St., Franklinville 3, N. Y.—C, CW
Electrical Specialty Co., 2304 Washington St., Boston 19, Mass.—A, AU, C, CW, P, VR
Electrical Windings, Inc., 2015 N. Kolmar Ave., Chicago 39, Ill.—A, AU, C, CW, P
Electricoil Transformer Co., 421 Canal St., New York 13, N. Y.—A, AU, B, C, CW, T, PT, P, WT
Electron Equipment Corp., 917 Meridian Ave., So. Pasadena, Calif.—"Elco"—P, VR
Electronic Components Co., 423 N. Western Ave., Los Angeles 4, Calif.—A, AU, C, CW, P
Electronic Engineering Co., 3223 W. Armitage Ave., Chicago 47, Ill.—VR
Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—A, AU, B, C, CW, T, FA, MT, PT, P, RT, WT
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—T, RT, VR
Electro-Voice, Inc., P.O. Box 897, South Bend 24, Ind.—MT
Emerson Radio & Phonograph Corp., 111 Eighth Ave., New York 11, N. Y.—A, C, MT, P
Ensign Coil Co., 2516 S. Pulaski, Chicago 23, Ill.— A, C, CW
Excel Transformer Co., 2567 38th Ave., Oakland 1, Calif.—A, AU, C, T, P
Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—A, AU, B, C, CW, T, MT, PT, P
Faraday Electric Corp., Adrian, Mich.—A
Fast & Co., John E., 3129 N. Crawford Ave., Chicago 41, Ill.—C
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—A, C, P
Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20, N. Y.—A, AU, B, C, CW, T, P, VR, WT
Foster Co., A. P., 630 Reading Rd., Reading, Cincinnati 15, Ohio—A, AU, C, CW, P
France Mfg. Co., 10325 Berea Rd., Cleveland 2, Ohio —T, FA, R
Franklin Transformer Mfg. Co., 65 22nd Ave., N. E., Minneapolis 13, Minn.—A, AU, C, CW, P, VR, WT
Freed Transformer Co., 72 Spring St., New York 12, N. Y.—A, AU, B, C, CW, T, P
Gardner Electric Mfg. Co., 4227 Hollis St., Emeryville 8, Calif.—AU, C, CW, P, RT, WT

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—"G-R"—"Variac"—AU, VR
General Transformer Corp., 1250 W. Van Buren St., Chicago 7, Ill.—"Streamliner"—A, AU, C, CW, T, FA, R, P
General Winding Co., 420 W. 45th St., New York 19, N. Y.—A, B, C, CW, T, R, MT, PT, P
Glenn-Roberts Co., 3100 E. Tenth St., Oakland 1, Calif.—WT
Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—P, VR, WT
G-R—General Radio Co.
Gracoil—Gramer Co.
Gramer Co., 2734 N. Pulaski Rd., Chicago 39, Ill.—"Gracoil"—A, AU, B, C, CW, FA, R, P
Guided Radio Corp., 161 Sixth Ave., New York 13, N. Y.—A
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—AU, MT
Grayhill, 1 N. Pulaski Rd., Chicago 24, Ill.—CW
Guaranteed Products, Wellington 1, Ohio—FA
Gulow Corp., 26 Waverly Pl., New York 3, N. Y.—VR
Hadley Co., Robert M., 707-711 E. 61st St., Los Angeles 1, Calif.—A, AU, C, CW, FA, P
Halldorson Co., 4500 Ravenswood Ave., Chicago 40, Ill.—A, AU, C, CW, T, P, RT, VR, WT
Hannon Electric Co., 1605 Waynesburg Rd., S. E., Canton, Ohio—WT
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif.—P, VR
Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—A, AU, C, CW, T, P
Haydu Bros., P. O. Box 1226, Plainfield, N. J.—C
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.—A, AU, C, CW, T, R, MT, PT, P, WT
Hollywood Transformer Co., 11034 Blix St., N. Hollywood, Calif.—A, C, CW
Howard Pacific Corp., 932 N. Western Ave., Los Angeles 27, Calif.—A, AU, C, CW, P
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—A, AU, C, CW, R, P
Industrial Electronics Corp., 80 Bank St., Newark, N. J.—C, CW, R, PT
Industrial Instruments, Inc., 17 Pollock Ave., Jersey City 5, N. J.—B
Industrial Transformer Corp., 2540 Belmont Ave., New York 58, N. Y.—A, AU, B, C, CW, T, FA, R, MT, PT, P, RT, VR, WT
Insuline Corp. of America, 36-02 35th Ave., Long Island City 10, N. Y.—C, CW
Intex Co., 303 W. 42nd St., New York 18, N. Y.—CW
Islip Radio Mfg. Corp., Islip, N. Y.—A, AU, C, CW, P
Jefferson Electric Co., 25th Ave. & Madison St., Bellwood, Ill.—A, AU, C, FA, R, P
Joyner Corp., 462 N. Parkside Ave., Chicago 44, Ill.—A, CW
Kahle Engineering Co., 1807 7th St., North Bergen, N. J.—WT
Kegron Mfg. Co., Inc., 18 W 20th St., New York 11, N. Y.—A, AU, C, CW
Kenyon Transformer Co., Inc., 840 Barry St., New York 59, N. Y.—A, AU, B, C, CW, PT, P, WT
Kollsman Instrument Div., Square D Co., 80-08 45th Ave., Elmhurst, N. Y.—RT
Kuhlman Electric Co., 1000 26th, Bay City, Mich.—A, AU, B, C, T, P, WT
Kyle Corp., South Milwaukee, Wis.—A, AU, T, P, VR
Langevin Co., Inc., 37 W. 65th St., New York 23, N. Y.—A, AU, B, C, CW, T, P, RT
Magnetic Products Co., Norwalk, Conn.—CW, P
Magnetic Windings Co., Div. Essex Wire Corp., 416 S. 16th St., Easton, Pa.—A, C, CW, T, PT, P, WT
Maguire Industries, Inc., Eleetronics Div., 342 W. Putnam Ave., Greenwich, Conn.—A, AU, B, C, CW, T, MT, PT, P
Maico Co., Inc., 21 N. Third St., Minneapolis 1, Minn.—CW
Mattern Mfg. Co., F., 4647 N. Cicero Ave., Chicago 30, Ill.—P
Merit Coil & Transformer Corp., 4427 N. Clark St., Chicago 40, Ill.—A, AU, C, CW, T, R, MT, PT, P, RT, VR
Michigan Fluorescent Light Co., 71-77 S. Parke St., Pontiac, Mich.—R, PT
Miller Co., B. F., P. O. Box 56 B, Trenton, N. J.—AU, C, CW, P, T, VR
Miller Co., J. W., 5917 S. Main St., Los Angeles 3, Calif.—C, CW
Mohawk Electric Mfg. Co., 60-62 Howard St., Irvington 6, N. J.—AU, CW, T, WT
Moloney Electric Co., 5390 Bircher Blvd., St. Louis 20, Mo.—P
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—C
National Co., Inc., 61 Sherman St., Malden 48, Mass.—"National"—A, AU, C, CW, P
Newark Transformer Co., 17 Frelinghuysen Ave., Newark 5, N. J.—C, CW, T, P, VR, WT
Newcomb Audio Products Co., 2815 S. Hill St., Los Angeles 7, Calif.—A, PT
New York Transformer Co., 62 William St., New York, N. Y.—A, AU, C, CW, T, FA, R, MT, PT, P, VR, WT
Northern Communications Mfg. Co. 210 E. 40th St., New York 16, N. Y.—A, AU, B, C, CW, T, P
Nothelfer Winding Labs., 111 Albermarle Ave., Trenton 8, N. J.—AU, C, CW, T, P, WT
Ocram Corp., Auburn Rd., Seneca Falls, N. Y.—"Ocram"—AU, C, CW, VR
Operadio Mfg. Co., St. Charles, Ill.—A, C, CW
Osborne Transformer Corp., 948 E. Lafayette Ave., Detroit 7, Mich.—A, AU, C, CW, T, P
Peerless Electrical Products Co., 6920-7004 McKinley Ave., Los Angeles 1, Calif.—A, AU, B, C, CW, T, FA, R, MT, PT, P
Permoflux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—A, C
Pilot Electric Co., 29 S. Broadway, Long Branch, N. J.—CW
Potter Co., 1950 Sheridan Rd., North Chicago 1, Ill.—R
Price Electric Corp., East Church & Second Sts., Frederick, Md.—CW
Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich.—WT
Quad Mfg. Co., 462 N. Parkside Ave., Chicago 44, Ill.—C, CW
Radionic Controls, 3758 Belmont Ave., Chicago 18, Ill.—A, C, CW
Radionic Transformer Co., 411 S. Sangamon St., Chicago 7, Ill.—A, AU, C, CW, T, R, PT
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—A, AU, B, C, CW, T, PT, P, VR, WT
Rectifier Engineering Co., 1809 E. 7th St., Los Angeles 21, Calif.—AU, C, CW
Red Arrow Electric Corp., 100 Colt St., Irvington 11, N. J.—A, AU, C, CW, T, MT, P, WT
Rittenhouse Co., A. E., Honeoye Falls, N. Y.—AU, CW, PT
Rogers Precision Products Co, 270 Lafayette St., New York 12, N. Y.—R, MT
Shure Bros., 225 W. Huron St., Chicago 10, Ill.—MT
Sitton Transformer Corp., 763 Tifton St., N. W., Atlanta, Ga.—AU, C, CW, T, R, PT, VR
Smith Mfg. Co., Nathan R., 105 Pasadena Ave., South Pasadena, Calif.—C, CW, R
Sola Electric Co., 2525 Clybourn Ave., Chicago 14, Ill., AU, R, VR
Sorensen & Co., Inc., 375 Fairfield Ave., Stamford, Conn.—A, AU, C, P, VR
Sorgel Electric Co., 838 W. National Ave., Milwaukee 4, Wis.—T, P, WT
Stamford Electric Products Co. Inc., Sunnyside Ave., Stamford, Conn.—A, C, CW, MT, P
Stancor—Standard Transformer Corp.
Standard Transformer Corp., 1500 N. Halsted St., Chicago 22, Ill.—"Stancor"—A, AU, C, CW, FA, R, P, VR, WT
States Co., 19 New Park Ave., Hartford 6, Conn.—AU, CW, VR, WT
Stockwell Transformer Corp., 295 N. State St., Concord, N. H.—A, AU, C, CW, T, R, MT, PT, P, RT, VR, WT
Streamliner—General Transformer Corp.
Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.—A, C, CW, T, FA, R, MT, PT, P, RT, VR
Supreme Instruments Corp., Greenwood, Miss.—A
S-W Inductor Co., 1056 N. Wood St., Chicago 22, Ill.—CW
Swain Nelson Co., 2320 Glenview Ave., Glenview, Ill.—A, AU, C, P, VR
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—R
Taylor Winfield Corp., 1052 Mahoning Ave., N. W., Warren, Ohio—AU, WT
Techno-Scientific Co., 901 Nepperhan Ave., Yonkers 3, N. Y.—VR
Telex Products Co., Minneapolis, Minn.—A, C
Thermador Electric Mfg. Co., 5119 S. Riverside Dr., Los Angeles 22, Calif.—A, AU, B, C, CW, T, FA, R, MT, PT, P
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—"Thordarson"—A, AU, B, C, CW, T, MT, PT, P, VR, WT
Times Telephoto Equipment, Inc., 229 W. 43rd St., New York 18, N. Y.—A
Transicoil Corp., 114 Worth St., New York 13, N. Y.—AU, B, C, CW, T, P
U. S. Television Mfg. Corp., 106 Seventh Ave., New York 11, N. Y.—DY
United Transformer Corp., 150 Varick St., New York 13, N. Y.—"UTC"—A, AU, B, C, CW, T, FA, R, MT, PT, P, RT, VR, WT
Universal X-Ray Products, Inc., 1800 N. Francisco Ave., Chicago 47, Ill.—CW
Utah Radio Products Co., 812-20 N. Orleans St., Chicago 10, Ill.—A, AU, C, R, P, VR
UTC—United Transformer Corp.
Vacolite Co., 3001-3003 N. Henderson, Dallas, Tex.—A, C
Variac—General Radio Co.
Viking Electronics Corp., 2143 West Division St., Chicago 22, Ill.—A, CW
Walker, Inc., Robert, 403 W. 8th St., Los Angeles 14, Calif.—AU, MT
Walsh Engineering Co., 34 De Hart Pl., Elizabeth 2, N. J.—A, AU, C, CW, P
Webster Electric Co., 1900 Clark St., Racine, Wis.—CW
Wheeler Insulated Wire Co., Inc., 378 Washington Ave., Bridgeport 4, Conn.—A, AU, C, CW R, P

(39) Transmitter & Transceiver Equipment



Amateur ..... **A**
Auto code senders ..... **AC**
Aviation (xmitters) ..... **AV**
Broadcast (xmitters) ..... **BC**
Citizens' radio communication ..... **CR**
Code ..... **CW**
Control consoles ..... **CC**
Direction finding ..... **DF**
Facsimile ..... **FAC**
Frequency modulation ..... **FM**
Keys ..... **K**
Marine (xmitters) ..... **M**
Police (xmitters) ..... **P**
Radioteletype ..... **RT**
Speech amplifiers ..... **SA**
Studio equipment ..... **SE**
Television transmitters ..... **T**
Transmission monitor equip. ..... **TM**

Abbott Instrument, Inc., 608 W. 18th St., New York 11, N. Y.—CR
Aeronautical Radio Mfg. Co., 155 First St., Mineola, L. I., N. Y.—AV
Air Communications, Inc., 2233 Grand Ave., Kansas City, Mo.—DF, AV
Air-Track Mfg. Co., A Div. of Aerodynamic Research Corp., 5009 Calvert Road, College Park, Md.—A, AV, CR, CW, M, SA, TM
Aireon Mfg. Corp., Fairfax & Funston Rds., Kansas City 15, Kans.—AV, M, P
Airplane & Marine Instruments, Inc., Clearfield, Pa.—AV, DF, M, SA
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—FAC
American Coil & Engineering Co., 1271 N. Hermitage Ave., Chicago 22, Ill.—AV, BC, P
American Communications Corp., 306 Broadway, New York, N. Y.—CC, SA
American Electronics, 37 E. 18th St., New York 3, N. Y.—FAC, SA, T
American Radio Co., 611 E. Garfield Ave., Glendale 5, Calif.—AV, BC, CC, M, P, SA
American Radio Hardware Co., 152-4 MacQueston Pkwy., S., Mt. Vernon, N. Y.—K
Amplifier Co. of America, 398 Broadway, New York 13, N. Y.—SA
Baker & Williamson, Upper Darby, Pa.—AV, BC, M, P, RT, SA, T, TM
Bassett, Inc., Rex, 311 N. W. 1st Ave., Ft. Lauderdale, Fla.—AV, M, P
Bell Sound Systems, Inc., 1183 Essex Ave., Columbus 3, Ohio—SA
Bendix Radio Division, Bendix Aviation Corp., E. Joppa Rd., Baltimore 4, Md.—AV, CC, SA
Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, North Hollywood, Calif.—AV
Bludworth Marine, Div. National-Simplex-Bludworth, Inc., 100 Gold St., New York 7, N. Y.—DF
Brelco Corp., 55 Van Dam St., New York 13, N. Y.—K, M, SA
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—AC, AV, BC, CC, FAC, K, M, P, RT, SA, T
Burnett Radio Laboratory, William W. L., 4814 Idaho St., San Diego 4, Calif.—M, P, TM
Clark Radio Equipment Corp., 4313 N. Lincoln Ave., Chicago 18, Ill.—CC, SA
Collins Radio Co., Cedar Rapids, Iowa—AV, BC, CC, M, P, SA
Communications Co., Inc., 300 Greco Ave., Coral Gables 34, Fla.—AV, CC, FM, K, M, P, TM
Communications Equipment Corp., 134 W. Colorado St., Pasadena 1, Calif.—A, M, P, SA
Cover Dual Signal Systems, Inc., Div. Electra Voice Corp., 5215 Ravenswood Ave., Chicago 40, Ill.—AV, P
Dahlstrom Metallic Door Co., Buffalo & E. Second, Jamestown, N. Y.—CC
DeMornay-Budd, Inc., 475 Grand Concourse, New York 51, N. Y.—AV
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—AV, BC, CC, M, P, SA, TM
Drake Co., R. L., 11 Longworth St., Dayton 2, Ohio—AV, FAC, M, TM
Dumont Laboratories, Inc., Allen B., 2 Main Ave., Passaic, N. J.—T, TM
Eastern Amplifier Corp., 794 E. 140th St., New York 54, N. Y.—SA
Eckstein Radio & Television Co., 914-18 La Salle Ave., Minneapolis 2, Minn.—SA
Electro-Medical Laboratory, Inc., Holliston, Mass.—K
Electronic Engineers, 611 E. Garfield Ave., Glendale 5, Calif.—AC, RT
Electronic Research Corp., 2655 W. 19th St., Chicago 8, Ill.—M, P, TM
Electronic Research & Mfg. Corp., 5805 Hough Ave., Cleveland 3, Ohio—AV, RT
Electronic Specialties Mfg. Co., 68 High St., Worcester 2, Mass.—A, CW
Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 26, Calif.—AV, DF
Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—SE, T
Erco Radio Laboratories, Inc., 231 Main St., Hempstead, N. Y.—AV, BC, CC, K, M, P, SA
Farnsworth Television & Radio Corp., Ft. Wayne 1, Ind.—AV, BC, M, P, T, TM
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—"Federal"—AV, BC, FAC, K, M, P, T

Finch Telecommunications, Inc., 10 E. 40th St., New York 16, N. Y.—FAC
Fisher Research Laboratory, 1961 University Ave., Palo Alto, Calif.—AV, M, P
Galvin Mfg. Corp., 4545 Augusta Blvd., Chicago 51, Ill.—"Motorola"—AV, CC, M, P
Garner Electronics Corp., 1100 W. Washington Blvd., Chicago 7 ,Ill.—M, P, SA
Gates Radio Co., 220 Hampshire St., Quincy, Ill.—AV, BC, M, P, SA, TM
Gem Radio & Television Co., 303 W. 42nd St., New York 18, N. Y.—A, M, CW
General Communication Co., 530 Commonwealth Ave., Boston 15, Mass.—DF, M, P
General Electric Co., Transmitter Div., Thompson Rd. Plant, Syracuse, N. Y.—AV, BC, CC, M, P, RT, SA, T, TM
Grady Instrument Co., 11 Bailey Ave., Watertown, Mass.—DF, M, P
Gray Radio Co., 730 Okeechobee Rd., West Palm Beach, Fla.—DF, M
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—AV, BC, CC, M, P, SA, T, TM
Hallicrafters Co., 2611 Indiana Ave., Chicago 16, Ill.—A, AV, CR, DF, FM, M, P, CW, BC, SA, TM
Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y—AV, BC, FAC, M, P, T, TM
Harvey Machine Co., Inc., 6200 Avalon Blvd., Los Angeles 3, Calif —DF, M
Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass.—M, P
Harvey-Wells Electronics, Inc., North St., Southbridge, Mass.—AV, BC, CC, M, P, RT, T, SA
Hatcher & Fisk, Inc., 125 Kansas Ave., Topeka, Kans.—AV
Heath Co., 305 Territorial, Benton Harbor, Mich.—AV
Henry Mfg. Co., 2213 Westwood Blvd., Los Angeles, Calif.—M, P
Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa.—AV, BC, M, P, SA
Higgins Industries, Inc., 2221 Warwick Ave., Santa Monica, Calif.—M, P, SA
Howard Pacific Corp., 932 N. Western Ave., Los Angeles 27, Calif.—BC
Huber Radio Co., 260 S. Center St., Casper, Wyo.—P
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—M, P, SA
Instructograph Co., 4701 Sheridan Rd., Chicago, Ill.—AC
Islip Radio Mfg. Corp., Beech St., Islip, N. Y.—AV, BC, M, P, SA, TM
Jefferson, Inc., Ray, 40 E. Merrick Rd., Freeport, L. I., N. Y.—M
Jefferson-Travis Corp., 245 E. 23rd St., New York 10, N. Y.—AV, M, P
Kaar Engineering Co., 619 Emerson St., Palo Alto, Calif.—M, P
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—K
Kluge Electronics Co., 1031 N. Alvarado St., Los Angeles 26, Calif.—A, AV, BC, CC, M, P, SA, TM, CW
Langevin Co., Inc., 37 W. 65th St., New York 23, N. Y.—SA
Lavoie Laboratories, Morganville, N. J.—AV, TM, M, P
Lawton Products Co., Inc., 624 Madison Ave., New York 22, N. Y.—AV, M
Lear, Inc., 1480 Buchanan Ave., S. E., Grand Rapids 2, Mich.—AV
Lewyt Corp., 60 Broadway, Brooklyn 11, N. Y.—AV
Lincoln Electronics Corp., 653 11th Ave., New York, N. Y.—AV, BC, CC, M, P, SA, TM
Link, Fred M., 125 W. 17th St., New York 11, N. Y.—AV, BC, CC, P, RT, T
Logan Co., Les, 530 Gough St., San Francisco 2, Calif.—"Speed-X"—K
Long Co., L. J., 186 Grand St., New York 13, N. Y.—M
Maguire Industries, Inc., 1437 Railroad Ave., Bridgeport, Conn.—AV, SA
Maguire Industries, Inc., Electronics Div., 342 W. Putnam Ave., Greenwich, Conn.—AV, M, P
Marshall Radio Engineering Laboratories, 5008 Lankershim Blvd., North Hollywood, Calif.—CR, P
Megard Corp., 1601 S. Burlington Ave., Los Angeles 6, Calif.—CC, M, P, SA, TM
Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass.—P, SA
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—SA, TM
Motorola—Galvin Mfg. Corp.
National Co., Inc., 61 Sherman St., Malden 48, Mass.—SA, TM
Newcomb Audio Products Co., 2815 S. Hill St., Los Angeles 7, Calif.—SA
North Electric Mfg. Co., Box 417, Galion, Ohio—AC, K
Northern Communications Mfg. Co., 210 E. 40th St., New York 16, N. Y.—AV, SA
Northern Radio Co., 2208 Fourth Ave., Seattle 1, Wash.—M
Oxford-Tartak Radio Corp., 3911 S. Michigan Ave., Chicago, Ill.—AV, BC, M, P, SA
Press Wireless, Inc., 1475 Broadway, New York 18, N. Y.—AV, BC, CC, FAC, M, P, RT, SA, T, TM
Radio Engineering Labs., Inc., 35-64 36th St., Long Island City, N. Y.—FM
Radio Frequency Laboratories, Inc., Boonton, N. J.—AV
Radio Inventions, Inc., 155 Perry St., New York, N. Y.—FAC
Radio Laboratories, Inc., 2701 California Ave., Seattle 6, Wash.—M
Radio Mfg. Engineers, Inc., 300-306 First Ave., Peoria 6, Ill.—AV
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—CW, DF, M
Radio Receptor Co., Inc., 251 W. 19th St., New York 11, N. Y.—AV, BC
Radio Specialty Mfg. Co., 403 N. W. 9th St., Portland 9, Ore.—AU, TM
Raytheon Mfg. Co., Transmitter Div., 7517 N. Clark St., Chicago 26, Ill.—AV, BC, CC, FAC, M, P, RT, SA, T, TM
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—AV, BC, CC, FAC, P, SA, T, TM
Rehtron Corp., 4313 Lincoln Ave., Chicago 18, Ill.—CC, SA, TM
Ruby Electric Co., 729 Seventh Ave., New York, N. Y.—M, SA
Sargent Co., E. M., 212 9th St., Oakland, Calif.—DF
Schuttig & Co., Ninth & Kearny Sts., N. E., Washington 17, D. C.—AV, RT, SA, TM
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—AV, M, P
Selectograph Mfg. Co., 502 W. Colorado Ave., Colorado Springs, Colo.—AC
Silver Co., McMurdo, 1240 Main St., Hartford 3, Conn.—A, CW
Smith-Meeker Engrg. Co., 125 Barclay St., New York 7, N. Y.—M
Speed-X—Les Logan Co.
Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y.—AV, DF
Stancor—Standard Transformer Corp.
Standard Engineering Laboratories, 40 S. Oak Knoll Ave., Pasadena 1, Calif.—A, AU, AV, CC, P, CW
Standard Transformer Corp., 1500 N. Halsted St., Chicago 22, Ill.—"Stancor"—AV
Stephens Mfg. Co., 10416 National Blvd., Los Angeles 34, Calif.—SA
Stoddard Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—AV
Taller & Cooper, 75 Front St., Brooklyn 1, N. Y.—CC
Technical Radio Co., 275 9th St., San Francisco, Calif.—M, T
TelAutograph Corp., 16 W. 61st St., New York 23, N. Y.—FAC
Telegraph Apparatus Co., 325 W. Huron St., Chicago, Ill.—K
Temco—Transmitter Equipment Mfg. Co.
Thompson Co., John E., 1440 W. 47th St., Chicago 9, Ill.—T
Times Telephoto Equipment, Inc., 229 W. 43rd St., New York 18, N. Y.—FAC
Transmitter Equipment Mfg. Co., Inc., 345 Hudson St., New York 14, N. Y.—"Temco"—AV, BC, CC, FAC, M, P, RT, SA, T, TM
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—DF
U. S. Television Mfg. Corp., 3 W. 61st St., New York 23, N. Y.—CC, DF, FM, M, P, SA, T
Vibroplex Co., 833 Broadway, New York 3, N. Y.—K
Waterman Products Co., Inc., 2445-63 Emerald St., Philadelphia 25, Pa.—BC, SA
Webster Electric Co., 1900 Clark St., Racine, Wis.—CC
Western Electric Co., 195 Broadway, New York 7, N. Y.—AV, BC, CC, DF, FM, M, P, RT, SA, SE, TM
Westinghouse Electric Corp., East Pittsburgh, Pa.—AV, BC, CC, M, SA, T, TM
Wilcox Electric Co., Inc., 1400 Chestnut St., Kansas City 1, Mo.—AV, BC, CC, P
Wilson Mfg. Co., Inc., 600 N. Andrews Ave., Ft. Lauderdale, Fla.—AC
Winslow Co., 9 Liberty St., Newark 5 ,N. J.—K
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—SA

(40) Tubes

Ballast (regulating) ..... **B**
Cathode ray ..... **CR**
Electron multiplier ..... **EM**
Geiger-Mueller tubes ..... **GM**
Industrial and power rectifiers ..... **I**
Miniature tubes ..... **MT**
Phototubes ..... **PH**
Receiving ..... **R**
Special gaseous ..... **G**
Special tubes ..... **ST**
Television ..... **TT**
Transmitting ..... **T**
Velocity modulated ..... **VM**
Voltage control ..... **VC**
X-ray ..... **X**

Aireon Mfg. Corp., Fairfax & Funston Rds., Kansas City 15, Kans.—T
American Television Laboratories, Inc., 433 E. Erie St., Chicago 11, Ill.—CR, ST, TT
Amglo Corp., 4234 Lincoln Ave., Chicago 18, Ill.—B, CR, I, MT, PH, R, ST, TT, T, VC
Amperex Electronic Corp., 25 Washington St., Brooklyn 1, N. Y.—"Amperex"—CR, I, G, ST, TT, T
Amperite Co., 561 Broadway, New York, N. Y.—"Amperite"—B, VC
Askania Regulator Co., 1603 S. Michigan Ave., Chicago 16, Ill.—CR, ST
Aurex Corp., 1117 N. Franklin St., Chicago, Ill.—ST
Cetron—Continental Electric Co.
Chatham Electronics, 475 Washington St., Newark 2, N. J.—I, G, T
Continental Electric Co., 715 Hamilton St., Geneva, Ill.—"Cetron"—I, PH, ST
Cyclotron Specialties Co., Moraga, Calif.—GM
Distillation Products, Inc., Vacuum Equipment Div., 755 Ridge Rd. W., Rochester 13, N. Y.—GM
Dumont Laboratories, Inc., Allen B., 2 Main Ave., Passaic, N. J.—CR, ST, TT
Eimac—Eitel-McCullough, Inc.
Eitel-McCullough, Inc., San Bruno, Calif.—I, T
Electronic Enterprises, Inc., 65-67 Seventh Ave., Newark 4, N. J.—B, I, ST, TT, T
Electronic Products Co., 111 E. Third St., Mt. Vernon, N. Y.—I, G, ST, T
Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—CR, ST, TT
Electrons, Inc., 127 Sussex Ave., Newark 4, N. J.—I, G
Farnsworth Television & Radio Corp., Ft. Wayne 1, Ind.—EM, PH, ST, TT
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—I, ST, TT, T, VC
Freeland & Olschner Products, Inc., 611 Baronne St., New Orleans 13, La.—T
Gates & Co., Inc., Geo. W., Hempstead Turnpike & Lucille Ave., Franklin Square, L. I., N. Y.—G
General Electric Co., Tube Div., 1 River Rd., Schenectady 5, N. Y.—B, CR, GM, I, MT, PH, R, G, ST, TT, T, VM, VC, X
General Electric X-Ray Corp., 175 W. Jackson Blvd., Chicago 4, Ill.—X
General Electronics, Inc., 101 Hazel St., Paterson, N. J.—B, I, ST, TT
Geophysical Instrument Co., 1820 N. Nash St., Arlington, Va.—GM
Goodall Electric Mfg. Co., Third & Main St., Ogallala, Nebr.—I
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—R, T
Hanovia Chemical & Mfg. Equipment, 233 N. J. R. R. Ave., Newark 5, N. J.—G
Herbach & Rademan Co., Mfg. Div., 517 Ludlow, Philadelphia 6, Pa—GM
Heintz & Kaufman, Ltd., Tanforan Ave., S. San Francisco 4, Calif.—"HK"—I, ST, T, G
HK—Heintz & Kaufman, Ltd.
Hytron Radio & Electronics Corp., 76 Lafayette St., Salem, Mass.—"Hytron"—B, I, MT, R, ST, T
Industrial & Commercial Electronics, Belmont, Calif.—I, T
Jennings Radio Mfg. Co., McLaughlin Rd., San Jose 12, Calif.—ST, T
J.F.D. Mfg. Co., 4111 Ft. Hamilton Parkway, Brooklyn 19, N. Y.—B
Ken-Rad Div., Electronics Dept., General Electric Co., Owensboro, Ky.—"Ken-Rad"—CR, R, ST, T
Kluge Electronics Co., 1031 N. Alvarado St., Los Angeles 26, Calif.—T
Kuthe Laboratories, Inc., 150 Summit St., Newark 4, N. J.—I, G, ST, T, VC
Lewis Electronics, 16 Lyndon Ave., Los Gatos, Calif.—CR, I, ST, T
Litton Engineering Laboratories, P. O. Box 749, Redwood City, Calif.—ST, T, VC
Machlett Laboratories, Inc., 1063 Hope St., Springdale, Conn.—I, ST, TT, T, X
National Union Radio Corp., 57 State St., Newark 2, N. J.—B, CR, I, MT, PH, R, G, ST, TT, VC
North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—CR, GM, TT, X
Northern Mfg. Co., Inc., 36 Spring St., Newark 2, N. J.—CR
Picker X-Ray Corp., 300 Fourth Ave., New York 10, N. Y.—X
Polk Electronics, 119 Bleeker St., New York 12, N. Y.—ST
Radio Corp. of America, Tube Div., Harrison, N. J.—CR, EM, I, MT, PH, R, G, ST, TT, T, VC
Radiotron—Radio Corp. of America
Rauland Corp., 4245 N. Knox Ave., Chicago 41, Ill.—CR, PH, TT
Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass.—B, CR, I, MT, R, G, TT, T, VM, VC
Sheldon Electric Co., Inc., 76 Colt St., Irvington 11, N. J. —I

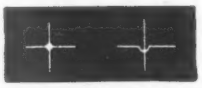
Slater Electric & Mfg. Co., 728 Atlantic Ave., Brooklyn 17, N. Y.—"Slater"—B, ST, T
Sonotone Corp., Saw Mill River Rd., Elmsford, N. Y. —MT, ST
Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y. —ST, VM
Sparti, Inc., Beech & Kenilworth, Norwood Sta., Cincinnati 12, Ohio—CR, ST, T
Standard Arcturus Corp., 30-34 Court St., Newark 2, N. J.—MT, R, TT, T
Sundt Engineering Co., 4763 Ravenswood Ave., Chicago, Ill.—ST
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—"Sylvania"—B, CR, I, MT, PH, R, G, ST, TT, T, VM, VC
Takk Corp., 28 W. Market St ., Newark, Ohio—G
Taylor Tubes, Inc., 2312 Wabansia Ave., Chicago 47, Ill.—"Taylor"—B, I, G, ST, T, VC
Televiso Products, Inc., 6533 Olmstead Ave., Chicago, Ill.—I, T
Translite, Inc., 639-647 Kent Ave., Brooklyn 11, N. Y. —I, R
Tung-Sol Lamp Works, Inc., 95 Eighth Ave., Newark 4, N. J.—"Tung-Sol"—I, MT, R, ST, TT, T, VM
United Electronics Co., 42 Spring St., Newark 2, N. J.—I, G, ST, TT, T
Universal X-Ray Products, Inc., 1800 N. Francisco Ave., Chicago 47, Ill.—GM, ST, X
Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio—GM, MT, ST
Western Electric Co., 195 Broadway, New York 7, N. Y. —I, PH, R, ST, T
Westinghouse Elec. Corp., MacArthur Plaza, Bloomfield, N. J.—B, I, PH, G, ST, TT, T, VM, VC, X
Westinghouse Elec. Corp., East Pittsburgh, Pa.—B, GM, I, PH, G, ST, T, VM, VC, X
Zetka Laboratories, Inc., 198-10-12 32nd Ave., Bayside, N. Y.—ST

(41) Tube Parts

Anodes, graphite ..... AG
Anodes, metal ..... AM
Bases ..... B
Base pins ..... BP
Cavities C
Fluorescent materials ..... F
Fused quartz parts ..... Q
Getters ..... G
Glass bulbs ..... GB
Grid & supports ..... GS
Mica parts ..... M
Rare gases ..... RG
Stamped parts ..... S
Tube repairing ..... TR
Tube seal leads ..... TS

Ace Mfg. Corp., Erie Ave. at "K" St., Philadelphia 24, Pa.—S
Admak Mfg. Co., 44-46 Cordier St., Irvington, N. J.—AM, S
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—B
Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1, N. Y. —AM
American Brass Co., 414 Meadow St., Waterbury 88, Conn.—AM, BP, S
American Gas & Chemical Co., Harrison, N. J.—RG
American Insulator Corp., New Freedom, Pa.—B
American Lava Corp., Chattanooga 5, Tenn.—B
American Radio Hardware Co., 152-4 MacQueston Parkway, S., Mt. Vernon, N. Y.—S
Art Wire & Stamping Co., 227 High St., Newark 2, N. J.—AM
Baker Chemical Co., J. T., North Broad St., Phillipsburg, N. J.—F
Barnes Co., Wallace, P. O. Box 1521, Bristol, Conn.—S
Bead Chain Mfg Co., 110 Mt. Grove St., Bridgeport 5, Conn.—BP, TS
Callite Tungsten Corp., 540 39th St., Union City, N. J. —AM, F, GS, S, TS, G
Cleveland Tungsten, Inc., 10200 Meech Ave., Cleveland 5, Ohio—GS, TS
Clifton Products, Inc., Blackbrook Rd., Painesville, Ohio—F
Corning Glass Works, Corning, N. Y.—GB
Crowley & Co., Inc., Henry L., 1 Central Ave., West Orange, N. J.—B
Driver Co., Wilbur B., 150 Riverside Ave., Newark 4, N. J.—AM
Du Pont de Nemours & Co., E. I., Patterson Screen Div., Main St., Towanda, Pa.—F
Eastern Engineering Co., 45 Fox St., New Haven 6, Conn.—B
Electronic Mfg. Co., 20 Orange St., Newark 2, N. J. —AM, B, BP, GS, S
Electronic Mechanics, Inc., 70 Clifton Blvd., Clifton, N. J.—B
Electronic Tube Corp., 1200 E. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.—F
Engineering Co., 27 Wright St., Newark, N. J.—TS
Faber, Merle F., 35 Stillman St., San Francisco, Calif. —B
Fansteel Metallurgical Corp., 2200 Sheridan Rd., North Chicago, Ill.—AM, G, S, TS
Feick Mfg. Div., Detroit Aircraft Prods., Inc., 10225 Meech Ave., Cleveland 5, Ohio—S
Foote Mineral Co., 12 E. Chelten Ave., Philadelphia 44, Pa.—G
Ford Radio & Mica Corp., 536 63rd St., Brooklyn 20, N. Y.—M
Freeland & Olschner Products, Inc., 611 Baronne St., New Orleans 13, La.—TR
General Ceramics & Steatite Corp., Crown Mill Rd., Keasbey, N. J.—B
General Electronics, Inc., 101 Hazel St., Paterson, N. J. —B
Glendale Vacuum Products Co., 8816 77th Ave., Brooklyn 27, N. Y.—TS
Goat Metal Stampings, Inc., 314 Dean St., Brooklyn 17, N. Y.—S
Hanovia Chemical & Mfg. Equipment, 233 N. J. R. R. Ave., Newark 5, N. J.—Q
Haydu Bros., P. O. Box 1226, Plainfield, N. J.—F, GS, RG, S
Hermaseal Co., Riverside Dr., Elkhart, Ind..—TS
Hermetic Seal Products Co., 416 Morris Ave., Newark, N. J.—TS
Howard Mfg. Corp., 1401 S. Main St., Council Bluffs, Iowa—B
Hydraulic Tool & Die Corp., 4625 Third Ave., New York 57, N. Y.—S
Industrial Screw & Supply Co., 717 W. Lake St., Chicago 6, Ill.—BP, S
King Laboratories, Inc., 205 Oneida St., Syracuse 4, N. Y.—G, S
Kling Metal Spinning Co., 174 Center St., New York 13, N. Y.—S
Krementz & Co., 49 Chestnut St,. Newark 5, N. J.—AM, BP, GS, S
Krischer Metal Products Co., 631-637 Kent Ave., Brooklyn 11, N. Y.—S
Lewis Electronics, 16 Lyndon Ave., Los Gatos, Calif. —TR
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.—RG
Litton Engineering Laboratories, P. O. Box 749, Redwood City, Calif.—GS, TS
Macallen Co., Macallen St., Boston 27, Mass.—M
Mica Insulator Co., 200 Varick St., New York 14, N. Y. —"Munsell"—M
Mica Products Mfg. Co., 69 Wooster St., New York 12, N. Y.—M
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—B
Munsell—Mica Insulator Co.
Munsell & Co., Eugene, 200 Varick St., New York 14, N. Y.—M
Mycalex Corp. of America, 60 Clifton Blvd., Clifton, N. J.—B
National Carbon Co., Inc., 30 E. 42nd St., New York 18, N. Y.—AG
Norton Laboratories, Inc., 560 Mill St., Lockport, N. Y. —B
Phonograph Needle Mfg. Co., Inc., 42-46 Dudley St., Providence 5, R. I.—BP
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—A, G, AM, B, BP, F, G, GB, GS, M, S, TS
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, Ohio—S
Remler Co., Ltd., 2101 Bryant St., San Francisco 10, Calif.—B
Rice's Sons, Bernard, 325 Fifth Ave., New York 16, N. Y.—AM, B, C, S
Scovill Mfg. Co., 99 Mill St., Waterbury 91, Conn.—AM, S
Speer Carbon Co., St. Marys, Pa.—AG
Stackpole Carbon Co., P. O. Box 327, St. Marys, Pa. —AG
Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.—B
Summerill Tubing Co., Bridgeport, Pa.—S
Superior Tube Co., Norristown, Pa.—AM
Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.—AG, AM, B, BP, C, F, G, GS, M, RG, S, TS
Tar Heel Mica Co., Plumtree, N. C.—M
Teleoptic Co., 1251 Mound Ave., Racine, Wis.—BP
U. S. Radium Corp., 535 Pearl St., New York 7, N. Y. —F
Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn.—B, S
Westinghouse Elec. Corp., East Pittsburgh, Pa.—AM, B, C, GS, S, TS
Wickwire Spencer Metallurgical Corp., 260 Sherman Ave., Newark 5, N. J.—GS
Winslow Co., 9 Liberty St., Newark 5, N. J.—S
York Electric & Machine Co., Carillotone Div., 30-34 N. Penn St., York, Pa.—AM, G, GS, M, TS

(42) Wire & Cable



Antenna (receiving) ..... A
Antenna (transmitting) ..... AT
Antenna transmission cable (rec) ..... AN
Antenna transmission cable (tr) ..... ANT
Cable assemblies ..... CA
Coaxial cable CC
Cords (attachment) ..... CO
Filament wire ..... FW
Flat woven cable ..... FL
Guy ..... G
High voltage ..... HV
Hook-up ..... HU
Insulated cable IC
Litzendraht L
Magnet ..... M
Mike cable ..... MC
Radio harness ..... H
Resistance ..... R
Resistance cords ..... RC
Shielded ..... S
Shielded ignition ..... SI
Solid dielectric-UHF ..... SD
Wave guides ..... W
Wire shielding ..... WS

A.B.C. Products, Inc., 2131 Stoner Ave., West Los Angeles 25, Calif.—CA
Accurate Insulated Wire Corp, 25 Fox St., New Haven 1, Conn.—CA, CO, HU, IC, MC, SI
Acme Wire Co., New Haven 14, Conn.—"Cottonite," "Enamelite," "Heatex," "Silkenite"—A, L, M
Acorn Insulated Wire Co., Inc., 225 King St., Brooklyn 31, N. Y.—CA, IC
Aeronautical Radio Mfg. Co., 155 First St., Mineola, L. I., N. Y.—A, AT, H, SI
Aircraft-Marine Products, Inc., 1523 N. 4th St., Harrisburg, Pa.—H
Alden Products Co., 117 N. Main St., Brockton 64, Mass.—CA, CO, FL, HV, HU, IC, H, RC, S, SI, WS
Allegheny Ludlum Steel Corp., Brackenridge, Pa.—R
Alpha Wire Corp., 50 Howard St., New York 13, N. Y. —AN, ANT, CA, CC, CO, FL, G, HU, IC, L, M, MC, H, RC, S, SI, WS
American Chain & Cable Co., Bridgeport 2, Conn.—G
American Electric Cable Co., 181 Appleton St., Holyoke, Mass.—CA, CO, FL, HV, HU, IC, MC, H, RC, S, SI, WS
American Phenolic Corp., 1830 S. 54th St., Cicero, Ill. —"Amphenol"—CC, CA, AN, ANT, SD
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, Ohio—CA, CC, CO, G, HV, HU, IC, M, MC, R, RC, S
Amphenol—American Phenolic Corp.
Amy, Aceves & King, Inc., 11 W. 42nd St., New York 18, N. Y.—"Multicoupler"—AN, CC
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.—A, AT, CC, FL, HV, IC, L, M, MC, R, RC, S
Andrew Co., 363 E. 75th St., Chicago 19, Ill.—AT, CC, W
Ansonia Electrical Co., 63 Main St., Ansonia, Conn.—AN, ANT, CC, HV, HU, IC, MC, S, SD
Arrow-Hart & Hegeman Elec. Co., 103 Hawthorn St., Hartford 6, Conn.—CO
Art Wire & Stamping Co., 227 High St., Newark 2, N. J.—FW
Associated Research & Engineering Laboratories, 38 Brady St., San Francisco 3, Calif.—CA, H
Austin Co., M. B., 108-116 S. Desplaines St., Chicago 6, Ill.—IC
Barker & Williamson, Upper Darby, Pa.—A, AT, CA
Belden Mfg. Co., P. O. Box 5070A, Chicago 80, Ill. —A, AT, AN, ANT, CA, CC, CO, FL, HV, HU, IC, L, M, MC, H, RC, S, SI, WS
Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, North Hollywood, Calif.—H
Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—CA
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N. Y.—A, AT, AN, ANT, CC, FW, FL, G, HV, HU, IC, M, MC, R, RC, S, SI, SD, WS
Branston Electric Mfg., Co., 61-65 Gill Pl., Buffalo 13, N. Y.—CA, H
Breeze Corporations, Inc., 24 S. Sixth St., Newark 7, N. J.—"Breeze Mark"—WS
Breeze Mark—Breeze Corporations, Inc.
Brown Co., 500 5th Ave., New York 18, N. Y.—WS
Bussey Pen Products Co., 5151 W. 65th St., Chicago 38, Ill.—G
Callite Tungsten Corp., 540 39th St., Union City, N. J. FW, CA
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.—IC, M, WS
Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.—WS
Cohn & Co., Sigmund, 44 Gold St., New York 7, N. Y. —FW
Collyer Insulated Wire Co., 249 Roosevelt Ave., P. O. Box 61, Pawtucket, R. I.—CC, CO, IC, S
Columbia Wire & Supply Co., 4106 N. Pulaski Rd., Chicago 41, Ill.—A, AT, AN, ANT, CA, CO, FL, HV, HU, IC, MC, H, RC, S, WS
Commercial Radio Sound Corp., 575 Lexington Ave., New York 22, N. Y.—A, CC
Communication Equipment & Engineering Co., 5646 W. Race St., Chicago 44, Ill.—A, AT

Communication Products, Inc., Route 36, Palmer Ave., Keansburg, N. J.—CC
Connecticut Cable Corp., Jewett, Conn.—CA, CO, H, RC
Consolidated Wire & Assoc. Corp., 1635 S. Clinton St., Chicago, Ill.—A, AN, ANT, AT, CO, HU, IC, M, MC, RC, S, SI, WS
Copperweld Steel Co., Glassport, Pa.—A, AT, CC, G
Cords, Ltd., Inc., 26 Camp St., Newark 5, N. J. —CA, CC, CO, H, RC, S, SI, WS
Cornish Wire Co., Inc., 15 Park Row, New York 7, N. Y.—"Corwico"—A, AT, CA, CO, G, HU, IC, MC, S
Corwico—Cornish Wire Co., Inc.
Cottonite—Acme Wire Co.
Couch Co., Inc., S. H., North Quincy 71, Mass.—IC
Crapo—Indiana Steel & Wire Co.
Crescent Cable Mfg. Co., Front St. & Central Ave., Pawtucket, R. I.—CA, CO, FL, IC, SI
Crystal Research Products, Dumont, N. J.—CA
DeMornay-Budd, Inc., 475 Grand Concourse, New York 51, N. Y.—W, CC
Diamond Wire & Cable Co., 128 E. 16th St., Chicago Heights, Ill.—A, CA, CO, HU, IC, MC, H, RC, S, WS
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—AN, ANT, CC, AT, A, CA
Dow Corning Corp., Midland, Mich.—IC
Driver Co., Wilbur B., 150 Riverside Ave., Newark 4, N. J.—FW, R
Driver-Harris Co., Middlesex St., Harrison, N. J.—FW, R
D-X Radio Products Co., 1200 N. Claremont Ave., Chicago 22, Ill.—A
Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza, S., Long Island City 1, N. Y.—CA, CO
Eastern Electronics Corp., 41 Chestnut St., New Haven, Conn.—H
Eby, Inc., Hugh H., 18 W. Chelten Ave., Philadelphia 44, Pa.—CA, H
Electric Auto-Lite Co., Wire & Cable Div., Port Huron, Mich.—CA, CO, FL, HV, HU, IC, M, MC, H, S, SI, WS
Electro-Marine Co., 274 Madison Ave., New York 16, N. Y.—A, AT, AN, CC
Electro-Voice, Inc., P.O. Box 897, South Bend 24, Ind.—MC
Electronic Mfg. Co., 339-347 W. Eighth Ave., Dubuque, Iowa—CO, H
Electronic Plumbing Corp., 311 Nepperhan Ave., Yonkers 2, N. Y.—W
Enamelite—Acme Wire Co.
Essex Wire Corp., 1601 Wall St., Ft. Wayne 6, Ind.—A, CA, CO, FL, HU, IC, L, M, MC, H, S, ST, WS
Federal Telephone & Radio Corp., 200 Mt. Pleasant Ave., Newark 4, N. J.—"Intelin"—A, AT, AN, ANT, CA, CC, FL, HV, HU, IC, H, S, SI, SD, CO, MC, H
Flexo Wire Co., 638 W. Genesee, Syracuse 1, N. Y.—A, AT, FL, WS
Franklin Mfg. Corp., A. W., 175 Varick St., New York 14, N. Y.—A
Gamewell Co., 1238 Chestnut St., Newton Upper Falls 64, Mass.—H
Gates & Co., Inc., Geo. W., Hempstead Tpke. & Lucille Ave., Franklin Square, L. I., N. Y.—CO
Gavitt Mfg. Co., Inc., Central St., Brookfield 1, Mass. —A, AN, HU, IC, MC, H, RC, S, WS
General Cable Corp., 420 Lexington Ave., New York 17, N. Y.—A, AT, AN, ANT, CO, HV, HU, IC, L, M, MC, S, SI
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—CO
General Electric Co., 1285 Boston Ave., Bridgeport 2, Conn.—CA, HU, IC, M, S, SI
General Insulated Wire Works, Inc., 69 Gordon Ave., Providence 5, R. I.—CA, CO, HU, IC, H, S, MC
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—CC
General Television & Radio Corp., 1240 N. Homan Ave., Chicago 51, Ill.—HC
Geophysical Instrument Co., 1820 N. Nash St., Arlington, Va.—W
Goldmark Wire Co., James, 116 West St., New York 7, N. Y.—FL, L, M, R, WS
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N. Y.—A, AT, AN, ANT, CA, CC, CO, FL, G, HU, M, MC, S, SD
Gussack Machined Products Co., 10-20 45th Rd., Long Island City, 1, N. Y.—A, CC
Guthman & Co., Inc., Edwin I., 15 S. Throop St., Chicago 7, Ill.—L, M
Haft & Sons, Inc., 79 Third St., Brooklyn 31, N. Y. —CA, CC
Hallett Mfg. Co., 603 S. Redondo Blvd., Inglewood, Calif.—SI
Hatfield Wire & Cable Co., Div. Robinson Foundation, Inc., 605 Hillside Ave., Hillside, N. J.—IC
Hazard Insulated Wire Works, Div. Okonite Co., P. O. Box 630, Wilkes-Barre, Pa.—HV, IC
Heatex—Acme Wire Co.
Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich. —R
Howard Pacific Corp., 932 N. Western Ave., Los Angeles 27, Calif.—H
Hudson Wire Co., Winsted Div., 981 Main St., Winsted, Conn.—IC, L, M
INCA—Phelps Dodge Copper Products Corp.
Indiana Steel & Wire Co., 700 S. Councll St., Muncie, Ind.—"Crapo"—G
Industrial Synthetics Corp., 60 Woolsey St., Irvington 11, N. J.—HU, H
Intelin—Federal Telephone & Radio Corp.
Interstate Mfg. Corp., 125 Sussex Ave., Newark 4, N. J. —H
Isolantite, Inc., 343 Cortlandt St., Belleville 9, N. J. —CA, CC, W
Jelliff Mfg. Corp., C. O., Pequot Rd., Southport, Conn. —R
J.F.D. Mfg. Co., 4111 Ft. Hamilton Pkwy., Brooklyn 19, N. Y.—A, CO, FL, IC, MC, H, R, RC
Johnson Co., E. F., Waseca, Minn.—"Johnson"—AT, ANT, CC, SD
Keeney & Co., Inc., J. H., 6610 S. Ashland Ave., Chicago 36, Ill.—CA
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—CA, CO, FL, G, HU, IC, M, S
Kennecott Wire & Cable Co., Philipsdale, R. I.—M
Kinetic Electronics Corp., 235 E. 42nd St., New York 17, N. Y.—CA, CO, H
King Laboratories, Inc., 205 Oneida St., Syracuse 4, N. Y.—FL
Kings Electronics Co., 372 Classon Ave., Brooklyn 5, N. Y.—A, AT, CA, W
Kraft & Kraft, Hicksville, N. Y.—H
Lapp Insulator Co., Inc., 24 Craigie St., LeRoy, N. Y. —CC, W
Lenz Lectric Mfg. Co., 1751 N. Western Ave., Chicago, Ill.—A, HU, IC, M, S
Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn.—CA, CO, IC, H, RC, WS
Lowell Insulated Wire, 171 Lincoln St., Lowell, Mass. —A, CA, CO, HU, IC, MC
Makepeace Co., D. E., Vine & Dunham Sts., Attleboro, Mass.—W
Martins Instrument Co., Inc., 316 37th St., Brooklyn 17, N Y.—H, CA
Meissner Mfg. Div., Maguire Industries, Inc., Mt. Carmel, Ill.—L
Miller Electric Co., 127 High St., Pawtucket, R. I.—CA, CO, H, WS
Mines Equipment Co., 4215 Clayton Ave., St. Louis 10, Mo.—CA
Molded Insulation Co., Aircraft Control Div., 335 E. Price St., Philadelphia 44, Pa.—H, W
Montgomery Co., Windsor Locks, Conn.—CO, R, RC
Multicoupler—Amy, Aceves & King, Inc.
National Molding Co., 2141 W. Washington Blvd., Los Angeles 7, Calif.—H
New England Electrical Works, Inc., 365 Main St., Lisbon, N. H.—A, FL, HU, IC, L, M, WS
Ney Co., J. M., 71 Elm St., Hartford 1, Conn.—R
Noma Electric Corp., 55 W. 13th St., New York 11, N Y.—CC, CO, HV, IC, M
Nonotuck Mfg. Co., Water St., Holyoke, Mass.—FL, HU
North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.—FW
Northern Electric Co., 5224 N. Kedzie, Chicago, Ill. —RC
Northern Mfg. Co., Inc., 36 Spring St., Newark 2, N. J.—FW
Okonite Co., Passaic, N. J.—AN, ANT, CC, CO, HV, IC, S, SI, SD
Packard Electric Division, General Motors Corp., Warren, Ohio—AN, CA, CO, HU, IC, H, S, SI, WS
Phelps Dodge Copper Products Corp., 40 Wall St., New York 5, N. Y.—"INCA"—AN, ANT, CC, HV, HU, IC, M, MC, S, SD
Pilot Industries, Inc., 202 E. 44th St., New York 17, N. Y.—CA, W
Plasticon—Plastic Wire & Cable Corp.
Plastic Wire & Cable Corp., 2 S. Golden St., Norwich, Conn.—"Plasticon"—TC, CO, HY, HU, IC, MC, S, SI, SD
Plastoid Corp., 19 W. 44th St., New York 18, N. Y.—CA, CC, CO, HV, HU, IC, H, S, WS
Porcelain Products, Inc., Parkersburg, W. Va.—G
Precision Tube Co., 3828 Terrace St., Philadelphia 28, Pa.—WS
Premax Products, Div. Chisholm-Ryder Co., Inc., 4612 Highland Ave., Niagara Falls, N. Y.—A, AT
Promenette Radio & Television Corp., 1721 Elmwood Ave., Buffalo 7, N. Y.—H
Radex Corp., 53 W. Jackson Blvd., Chicago 4, Ill.—CC
RCA Victor Division, Radio Corp. of America, Front & Cooper Sts., Camden, N. J.—"RCA"—FW
Rea Magnet Wire Co., Inc., E. Pontiac St., Ft. Wayne, Ind.—M
Rhode Island Ins. Wire Co., Cranston, R. I.—HU, IC
Rice's Sons, Bernard, 325 Fifth Ave., New York 16, N. Y.—CA
Riggs & Jeffreys, Inc., 73 Winthrop St., Newark 4, N. J.—CA, H
Rittenhouse Co., A. E., Honeoye Falls, N. Y.—CA
Riverside Metal Co., Riverside, N. J.—R
Rockbestos Products Corp., 100 Mitchell Rd., New Haven 4, Conn.—HV, HU, IC, M, S
Roebling's Sons Co., John A., 640 S. Broad St., Trenton 2, N. J.—A, AT, CO, FL, G, HU, IC, M, MC, S, SI, WS
Rome Cable Corp., 332 Ridge St., Rome, N. Y.—IC, M
Royal Electric Co., Inc., 95 Grand Ave., Pawtucket, R. I.—CA, CO, IC
Runzel Cord & Wire Co., 4727 W. Montrose Ave., Chicago 47, Ill.—CA, CO, HU, IC, H, WS
Rupp's Assembling & Mfg. Works, 2341 N. Seminary Ave., Chicago 14, Ill.—CA, CO, IC
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.—CC, IC, WS
Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—"Walsco"—A, CA, CO, IC, H, RC
Searle Aero Industries, Inc., P. O. Box 111, Orange, Calif.—CA
Selectar Mfg. Corp., 21-10 49th Ave., Long Island City 1, N. Y.—CC
Silkenite—Acme Wire Co.
Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.—CC, HV, IC, MC, S, SI, SD
South Shore Radio & Electric Corp., 6815 Stony Island Ave., Chicago 49, Ill.—CA
Special Electric Labs., 7657 S. Central Ave., Los Angeles 1, Calif.—CA
Spencer Wire Co., 68 Pleasant St., W. Brookfield, Mass. —R, WS
Supreme Instruments Corp., Greenwood, Miss.—CA
Suprenant Electrical Insulation Co., 84 Purchase St., Boston 10, Mass.—HU
Swedish Iron & Steel Corp., 17 Battery Pl., New York, N. Y.—R
Sweeo Wire Co., 138 Rowley, Winsted, Conn.—L, M
S-W Inductor Co., 1056 N. Wood St., Chicago 22, Ill. —A
Thermionic Engineering Corp., 32 W. 12th St., Bayonne, N. J.—CA
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—"Waveflex"—W
Uniform Tubes, Shurs Lane & Lauriston St., Philadelphia 28, Pa.—CC, S, SI, WS
U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.—A, CA, CC, CO, HV, HU, M, H, S
Walsco—Walter L. Schott Co.
Waveflex—Titeflex, Inc.
Western Insulated Wire Co., 1001 E. 62nd St., Los Angeles 1, Calif.—CA, CO, HV, IC, MC, S, SI, WS
Westinghouse Elec. Corp., East Pittsburgh, Pa.—AT, FW, M, W
Weymouth Instrument Co., 1440 Commercial St., East Weymouth 89, Mass.—CC, CO, W
Wheeler Insulated Wire Co., Inc., 373 Washington Ave., Bridgeport 4, Conn.—L, M
Whitaker Cable Corp., Kansas City 16, Mo.—CA, IC, H
White Electric Cable Co., Maple Ave., Haverstraw, N. Y.—AN, ANT, CC, CO, FL, HU, IC, M, MC, S
Whitney Blake Co., 1565 Dixwell Ave., New Haven 14, Conn.—CC, CO, HU, IC, MC, S
Wickwire Spencer Metallurgical Corp., 260 Sherman Ave., Newark 5, N. J.—FL, FW
Wind Turbine Co., West Chester, Pa.—A, AT, G
Wood Electric Co., Inc., C. D., 826 Broadway, New York 3, N. Y.—CO

HOW TO USE THIS DIRECTORY

To find the manufacturer of any product, look first in the Index, beginning on page D-3. For example, "Counters, electronic 12-C", means that under Section 12, "Electronc Contol Equipment", the letter "C" after a manufacturer's name indicates his ability to supply electronic counting devices.

SURVEY of WIDE READING

Electronic news in the world's press. Review of engineering, scientific and industrial journals, here and abroad

Positive Grid Current

J. L. H. Jonker and B. D. H. Telegen (Philips Research Reports, Eindhoven, Vol. 1, No. 1, October 1945)

The current resulting from electrons flowing directly from the cathode to a positive grid and the current resulting from electrons returning from the plate-grid space to the grid are computed. The article thoroughly investigates the problem, and compares the results obtained with rubber membrane studies.

Comparison of Beam Power Tubes and Triodes

J. K. Hillard (Journal of the Society of Motion Picture Engineers, January, 1946)

An experimental comparison is reported between the performance of beam power-tubes and triodes used in power amplifiers for driving loudspeakers. Since the intermodulation method of testing amplifiers appears to have the best correlation with actual listening tests, it was used in the present investigation.

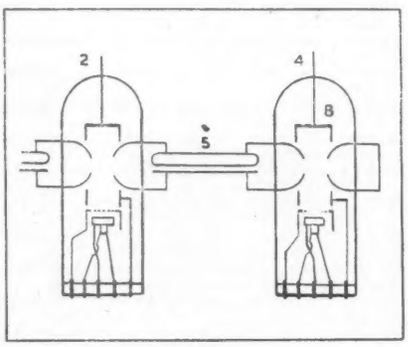
It is held that if suitable precautions regarding feedback are taken and if the coupling transformer is carefully designed, simple push-pull beam power tube circuits can deliver the same audio power as triodes with the same or less distortion, a high over-all power efficiency is obtained, and the signal-to-noise ratio is improved. Intermodulation tests establish superiority of beam power tube performance regarding distortion over triodes for the same output power.

Frequency Stabilization of Resonators

E. M. I. Laboratories (Electronic Engineering, London, February 1946)

In some instances it is desirable to vary the average beam current in a Klystron tube. This results in a change in the resonant frequency of the circuit. To stabilize the resonant frequency, a second variable intensity electron beam is introduced into the system and its intensity varied to compensate for the variation in resonant frequency caused by the original beam. This second beam must not interfere with the operation of the device in any other way and therefore must not generate any oscillations.

The figure shows a particular embodiment of the method for a reflex Klystron 2. Tube 4 is similar to tube 2 but prevented from generating oscillations by choosing a suitable potential for the plate 8. Depending on the length of coupling line 5, the beam current in tube 4 is controlled in intensity relative to the modulation of the beam intensity in tube 2 in such a manner that the frequency of oscillations set up in the resonator of tube 2 remains constant, or nearly so. If the length of line 5 is chosen appropriately, the beam current intensities of the two tubes may be modulated in antiphase.



One tube and one resonator may be employed, the system being constructed to be traversed by two electron beams. Instead of utilizing an auxiliary electron beam, a controllable gaseous discharge may be used.

Pentode and Beam Power Tube

L. Chretien (Toute La Radio, Paris, Dec. 1945)

The performance of a pentode as a power output stage is compared with that of a beam power tube, in particular with that of a 6L6. The dynamic characteristics are plotted and the generation of even harmonics for the beam power tube and of odd harmonics for the pentode is explained. Finally it is noted that the pentode is superior for a low load impedance while the tetrode is to be given preference for high load impedances.

Transmission Line Impedance Matching

C. T. Tai (Journal of Applied Physics, Jan. 1946)

The problem of using shunt and series sections of transmission lines as matching devices is investigated mathematically. When used alone both are limited to a certain range of impedances. However, the shunt sections are useful precisely in the range in which the series section cannot yield a match. If an additional section of line is included, both systems can be designed to match impedance. Simple formula for the required lengths of matching lines are derived; graphical representation is used extensively.

Spark-Generated Waves

M. G. Kelliher and E. T. S. Walton (Wireless Engineer, London, February 1946)

Short electromagnetic waves in the centimeter region generated by the spark between short tungsten rods immersed in oil are investigated by means of a concentric line resonator fitted with a crystal detector (silicon and tungsten point). The experiments establish that if the transformer used to produce the sparks is run on 50 cycles, about 20 to 30 wave trains are emitted every 0.01 second and that these wave trains show very much smaller damping than is predicted by theory. It is suggested that some mechanism may be present tending to maintain the oscillations. Whatever may be the explanation, if such a mechanism is present, the spark method of generating very short waves may be of more use in the future than has hitherto seemed likely.

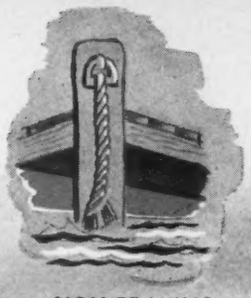
Monochromatic X-Rays

H. Lipson, J. B. Nelson and D. P. Riley (Journal of Scientific Instruments, London, Oct. 1945)

Crystal-reflected X-radiation is monochromatic, i.e., it contains rays of one wavelength only. It is being increasingly used for taking diffraction photographs because it eliminates the background due to the white radiation present in the direct beam from the X-ray tube, which permits more information to be obtained from diffraction patterns. Properties essential for the use in X-ray reflection of various crystals are reported and an instrument for mounting is described.

COMPLETE IMPREGNATION

FLEXIBILITY



NON-FRAYING

4th among the features of DIEFLEX VARNISHED TUBING PRODUCTS is... *Dielectric Strength*

COMPLETENESS OF LINE

GOOD PUSH-BACK QUALITY

The reason for the higher Dieflex dielectric strength is no secret. The braided cotton or Fiberglas sleevings are allowed to soak up to their saturation point the specially formulated baking-type insulating varnishes that are used on Dieflex varnished tubings and saturated sleevings. As many dips and bakes are given as are required to produce the Dieflex saturated sleeving or varnished tubing grade being made—all to meet or surpass VTA and ASTM standards.

Dieflex products have superior qualities of resistance to heat, moisture, oil, and most chemicals—long life—smooth inside bore—the ability to resume roundness after cutting—are non-fraying—and have excellent push-back qualities. Specify Dieflex and get the best!

Dieflex Products List

MADE WITH BRAIDED COTTON SLEEVING BASE

VTA Grade A-1 Magneto Grade Varnished Tubings

VTA Grade B-1 Standard Grade Varnished Tubings

VTA Grades C-1 and C-2 Heavily Coated Saturated Sleevings

VTA Grade C-3 Lightly Coated Saturated Sleevings

Heavy Wall Varnished Tubings and Saturated Sleevings

MADE WITH BRAIDED GLASS SLEEVING BASE

VTA Grade A-1 Magneto Grade Varnished Fiberglas Tubings

VTA Grade B-1 Standard Grade Varnished Fiberglas Tubings

VTA Grade C-1 Extra Heavily Saturated Fiberglas Sleevings

VTA Grade C-2 Heavily Saturated Fiberglas Sleevings

VTA Grade C-3 Lightly Saturated Fiberglas Sleevings

Silicone-Treated Fiberglas Varnished Tubings and Saturated Sleevings

SMOOTH INSIDE BORE

UNIFORMITY OF PRODUCT

ELECTRICAL IMC INSULATION

IMC SERVICE

INSULATION MANUFACTURERS CORPORATION

CHICAGO CLEVELAND
MILWAUKEE MINNEAPOLIS
DETROIT PEORIA

TRI-STATE SUPPLY CORPORATIONS

LOS ANGELES
SAN FRANCISCO
SEATTLE

INSULATION AND WIRES INCORPORATED

ST. LOUIS ATLANTA HOUSTON
DETROIT BLUEFIELD
BOSTON NEW YORK

RCA-1P42

—a tiny high-vacuum phototube with unusual possibilities

FEATURES

- Can be used in closely confined space
- Head-on structure permits close spacing of tubes in banks
- Excellent sensitivity—single amplifier stage is sufficient for many relay services
- Smooth end terminal permits pin-jack mounting
- High-vacuum insures high stability

THE RCA-1P42 high-vacuum phototube opens up entirely new fields of application to the design engineer—particularly for control purposes where space limitation is a prime consideration. Its extremely small size, combined with the unique "head-on" construction, permits exceedingly close spacing of the tubes in banks for controlling a large number of circuits, or the use of a single tube in closely confined quarters.

The semi-transparent cathode surface on the glass window in the large end of the 1P42 is sensitive to light sources predominating in blue radiation, and has negligible sensitivity to infrared radiation. The tube has an S-4 spectral response and maximum response at a wavelength of 4200 Angstroms.

The RCA-1P42 is especially designed for compact services such as the control of complex business-machine operations. It is also applicable to small equipment for sound-film reproduction.

A technical bulletin on the RCA-1P42 is available on request. RCA tube application engineers will be glad to work with you in adapting this or any other RCA tube types to your equipment designs. Address RCA, Commercial Engineering, Section D-7L, Harrison, N. J.

RATINGS AND CHARACTERISTICS

MAXIMUM RATINGS, ABSOLUTE VALUES:

Anode-Supply Voltage (DC or Peak AC)	150 max. Volts
Cathode-Current Density	14 max. Microamp/sq. in.
Average Cathode Current*	0.4 max. Microampere
Ambient Temperature	75 max. °C

CHARACTERISTICS:

Maximum Dark Current at 150 volts	0.005 Microampere
Sensitivity:	
At 4200 Angstroms	0.020 Microamp/uwatt
Luminous**	25 Microamp/lumen

MINIMUM CIRCUIT VALUES:

DC Load Resistance	1 Megohm

*On basis of the use of a sensitive cathode area 0.19" in diameter.

**Given for conditions where a Mazda projection lamp operated at a filament color temperature of 2870°K is used as a light source. With daylight, the value is several times higher; with light from a high-pressure arc, many times higher.

RCA Laboratories, Princeton, N. J.

THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA.

TUBE DEPARTMENT

RADIO CORPORATION of AMERICA

HARRISON, N. J.